

**CURRICULUM**  
**OF**  
**DISASTER MANAGEMENT**  
**BS/MS**



**(2014)**

**HIGHER EDUCATION COMMISSION**  
**ISLAMABAD**

# **CURRICULUM DIVISION, HEC**

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# PREFACE

The curriculum, with varying definitions, is said to be a plan of the teaching-learning process that students of an academic programme are required to undergo. It includes objectives & learning outcomes, course contents, scheme of studies, teaching methodologies and methods of assessment of learning. Since knowledge in all disciplines and fields is expanding at a fast pace and new disciplines are also emerging; it is imperative that curricula be developed and revised accordingly.

University Grants Commission (UGC) was designated as the competent authority to develop, review and revise curricula beyond Class-XII vide Section 3, Sub-Section 2 (ii), Act of Parliament No. X of 1976 titled “Supervision of Curricula and Textbooks and Maintenance of Standard of Education”. With the repeal of UGC Act, the same function was assigned to the Higher Education Commission (HEC) under its Ordinance of 2002, Section 10, Sub-Section 1 (v).

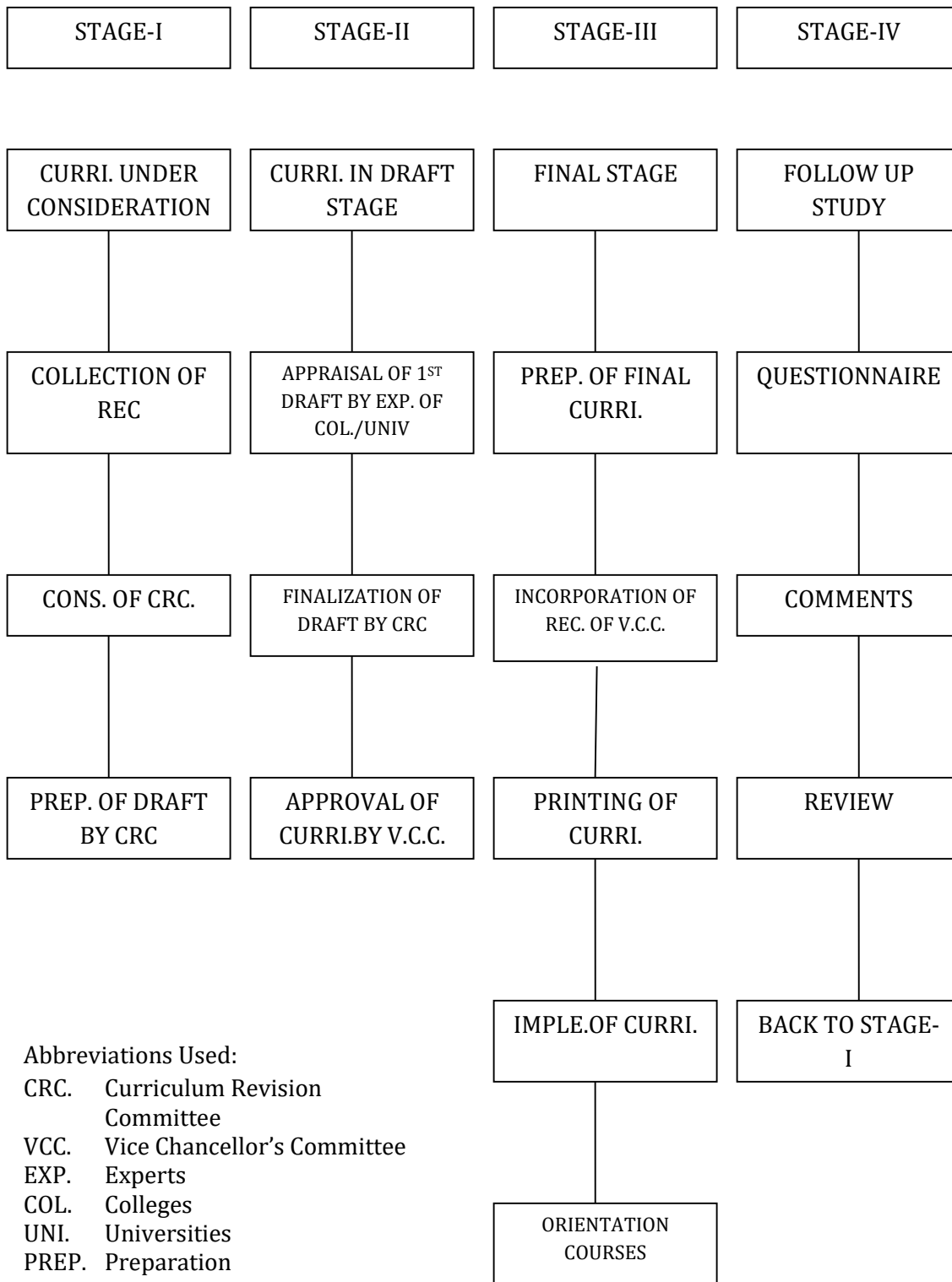
In compliance with the above provisions, the Curriculum Division of HEC undertakes the revision of curricula after every three years through respective National Curriculum Revision Committees (NCRCs) which consist of eminent professors and researchers of relevant fields from public and private sector universities, R&D organizations, councils, industry and civil society by seeking nominations from their organizations.

In order to impart quality education which is at par with international standards, HEC NCRCs have developed unified templates as guidelines for the development and revision of curricula in the disciplines of Basic Sciences, Applied Sciences, Social Sciences, Agriculture and Engineering in 2007 and 2009.

It is hoped that this curriculum document, prepared by the respective NCRC’s, would serve the purpose of meeting our national, social and economic needs, and it would also provide the level of competency specified in Pakistan Qualification Framework to make it compatible with international educational standards. The curriculum is also placed on the website of HEC ([www.hec.gov.pk](http://www.hec.gov.pk)).

**(Fida Hussain)**  
**Director General (Academics)**

# CURRICULUM DEVELOPMENT PROCESS



## INTRODUCTION

Final meeting of the National Curriculum Revision Committee (NCRC) on Disaster Management was held at the HEC Regional Centre, Lahore on March 05-07, 2014 to finalized the curricula for BS and MS in Disaster Management. The following subject experts from various universities attended the meeting.

S. No.	Name & Address	
1	Prof. Dr. Amir Nawaz Khan, Dean, Faculty of Life & Environmental Science, Centre for Disaster Preparedness & Management, University of Peshawar, Peshawar.	<b>Convener</b>
2	Dr. Amjad Ali, Lecturer, Centre for Disaster Preparedness & Management, University of Peshawar, Peshawar.	<b>Secretary/Member</b>
3	Prof. Dr. Muhammad Mehboob, Professor, Department of Civil Engg, Mehran University of Engg & Technology, Jamshoro, Sindh.	<b>Member</b>
4	Dr. Badar Munir Khan Ghauri, Professor, Department of Remote Sensing & Geo-Information Science, Institute of Space Technology, SUPARCO HQs, Off University Road, Gulzar Hijri, Karachi.	<b>Member</b>
5	Dr. Syed Mohammad Ali, Director / Associate Professor, Department of Earthquake Engineering, Room # 1, Earthquake Engineering Centre, University of Engineering & Technology, Peshawar.	<b>Member</b>
6	Dr. Ali Iqtadar Mirza, Chairperson, Department of Geography, Government College University, Lahore.	<b>Member</b>
7	Dr. Mobushir Riaz Khan, Associate Professor, Department of Space Science, Institute of Space Technology, SUPARCO, Islamabad Expressway,	<b>Member</b>

	Near Rawat Toll Plaza, Islamabad.	
8	Dr. Muhammad Jawed Iqbal, Assistant Professor, Department of Disaster Management, National University of Science & Technology (NUST), Civil Engineering Wing, MCE Risalpur Cantt, KPK.	<b>Member</b>
9	Cap. Asif Iqbal Asif, Director NIDM, National Disaster Management Authority, Islamabad.	<b>Member</b>
10	Dr. Syed Amer Mahmood, Assistant Professor, Department of Space Sciences, University of Punjab, Lahore,	<b>Member</b>
11	Dr. Muhammad Shafique Assistant Professor, National Centre of Excellence in Geology, University of Peshawar, Peshawar.	<b>Member</b>
12	Dr. Ayub Elahi, Faculty of Civil & Environmental Engineering, University of Engineering & Technology (UET), Taxila.	<b>Member</b>
13	Dr. Abdur Rehman Cheema, Program Manager/Assistant Professor, Department of Science and Technology Development Studies, SZABIST, H-8/4, Islamabad.	<b>Member</b>

The meeting was started with recitation from the Holy Quran by Mr. Abid Wahab, Assistant Director, Higher Education Commission, Islamabad. After recitation, Prof. Naeem Khalid, Advisor to Higher Education Commission, Curriculum welcomed the participants. The convener of the committee, Prof. Dr. Amir Nawaz Khan, Dean Faculty of Life and Environmental Sciences, University of Peshawar highlighted the importance of curriculum development at national level. Mr. Nazeer Hussain, Director, Higher Education Commission, Lahore gave a quick rundown of the efforts by HEC to promote Higher Education in Pakistan with special reference to the development of curriculum and its accreditation.

The Secretary of the committee, Dr. Amjad Ali, Lecturer, Centre for Disaster Preparedness & Management, University of Peshawar, discussed the progress of last meeting held on September 9-11, 2013. The Convener of the committee and worthy members shows full satisfaction on the progress made in last NCRC meeting. The worthy members thoroughly discussed and finalized the vision, mission, title of the degree, eligibility criteria, and layout of BS & MS in disaster Management. The participants reviewed each course keeping in view the comments of their colleagues at their respective universities. Courses were thoroughly reviewed and modified. New courses were also added in the curriculum of Disaster Management keeping in view the emerging trends.

The committee finalized the curriculum for Under-graduate and Post-graduate levels of Disaster Management. On behalf of HEC, Mr. Abid Wahab, Assistant Director (Curriculum) HEC appreciated the inputs of the participants during the meeting and thanked all the participants. Finally, the meeting was concluded with the vote of thanks by the Chair.

### **VISION**

Our vision is to contribute towards national integration and consolidation and help overcome the sense of forlornness and alienation in vulnerable communities.

### **MISSION**

Our commitment is to equip human beings with the knowledge and skills to minimize the damages and miseries of disasters.

### **AIMS AND OBJECTIVES**

In the meeting following objectives were considered:

1. To develop international standard Disaster Management curriculum for 4 years BS and 2 years MS curriculum so that the uniformity could be adopted by the public and private sector institutions throughout the country.
2. To impart current knowledge and practical skills to Disaster Management graduates through theory, practical and field exercises.

The following decisions were made in the meeting accordingly.

### **TITLE OF THE DEGREE**

The title of the degree for BS and MS was discussed by the committee. The committee unanimously approved “**Disaster Management**” as the title of the all degree programmes to be offered by the HEC.



# PART-I: SCHEME OF STUDY FOR BS (04 YEARS) PROGRAMME

## ELIGIBILITY OF CRITERIA

FSc/FA with Mathematics, Biology, Statistics, Computer Science, Geography, Economics and Commerce.

## DURATION

Four years programme spread over 8 semesters (i.e. two semesters per year).

## DEGREE REQUIREMENT

Minimum of 124 credits are required to complete 4 years BS in Disaster Management.

## EVALUATION

For the uniformity in the evaluation system, NCRC recommends that the minimum CGPA required to pass a semester is 2.0 out of 4.0 at undergraduate level or decided by the respective bodies of the university as per rules in vogue.

## STANDARDIZED FORMAT / SCHEME OF STUDIES FOR FOUR-YEAR INTEGRATED CURRICULA FOR BACHELOR DEGREE IN BASIC, SOCIAL, NATURAL AND APPLIED SCIENCES

## STRUCTURE

Sr.	Categories	No. of courses Min – Max	Credit Hours Min – Max
1.	Compulsory Requirement (No Choice)	9 – 9	25 – 25
2.	General Courses to be chosen from other departments	7 – 8	21 – 24
3.	Discipline Specific Foundation Courses	9 – 10	30 – 33
4.	Major Courses including research project / Internship	11 – 13	36 – 42
5.	Electives within the major	4 – 4	12 – 12
	<b>Total</b>	<b>40 – 44</b>	<b>124 – 136</b>

- Total numbers of Credit hours      124-136
- Duration                                      4 years
- Semester duration                        16-18 weeks
- Semesters                                    08
- Course Load per Semester        15-18 Cr hr
- Number of courses per semester    4-6 (not more than 3 lab / practical courses)

## LAHOUT FOR BS DISASTER MANAGEMENT

Compulsory Requirements (the student has no choice)		General Courses to be chosen from other departments	
9 courses		7-8 courses	
25 Credit hours		21-24 Cr. Hours	
Subject	Cr. hr	Subject	Cr. hr
1. English I	3	1. Fundamentals of Geography	3
2. English II	3	2. General Geology	3
3. English III	3	3. Introduction to Environmental Science	3
4. English IV/ Statistics I / Univ. Optional *	3	4. Sociology	3
5. Pakistan Studies	2	5. Introduction to Economics	3
6. Islamic Studies / Ethics	2	6. Introduction to Psychology	3
7. Mathematics I	3	7. Fundamentals of GIS and RS	2+1
8. Mathematics II / Statistics II/ Univ. Optional **	3	8. Principles of Management	3
9. Introduction to Computer	3		
	<b>25</b>		<b>24</b>

Discipline Specific Foundation Courses		Major courses including research project/internship		Elective Courses within the major	
9-10 courses		11-13 courses		4 courses	
30-33 Credit hours		36-42 Credit hours		12 Credit Hours	
Subject	Cr. hr	Subject	Cr. hr	Subject	Cr. hr
1. Basic Science of Natural Hazards	3	1. Research Approaches in Disaster Management	3	Elective-I (7)	3
2. Fundamental of Disaster Management	3	2. Applied Geomorphology and Natural Hazards	3	Elective-II (7)	3
3. Basic Principles of Disaster Planning and Management	3	3. Gender Mainstreaming in Disaster Management	3	Elective-III (8)	3
4. Disaster and Sustainable Development	3	4. Economics of Disasters	3	Elective-IV (8)	3

5. Community Based Disaster Risk Management	3	5. Disaster Project Management	3		
6. Hydro-meteorological Hazards	3	6. Multi-Hazards Vulnerabilities	3		
7. Geo-Hazards	3	7. Research Project /Internship	1+2		
8. Complex & Biological Hazards	3	8. Natural Hazards of Pakistan	3		
9. Emergency Management	3	9. Disasters Risk and Urbanization	3		
10. Disaster Risk Management	3	10. GIS and RS in Disaster Management	2+1		
		11. Climate Change and Natural Hazards	3		
		12. Hazard Mapping Techniques	2+1		
		13. Practical in Disaster Management	1+2		
	<b>30</b>		<b>39</b>		<b>12</b>

\* University has the option to recommend any other course in lieu of English IV

\*\* University may recommend any other course in lieu of Mathematics II

## SCHEME OF STUDIES FOR BS IN DISASTER MANAGEMENT

Course No.	Course Titles	Credit Hrs.
	English-I	3
	Pakistan Studies	2
	Math/Stat-1	3
	G-I Fundamentals of Geography	3
	G-II General Geology	3
DM 311	FOUNDATION-I Basic Science of Natural Hazards	3
		<b>17</b>
	English-II	3
	Islamic Studies / Ethics	2
	Math/stat-II / Univ. Optional	3
	G-III Introduction to Environmental Science	3
	G-IV Sociology	3
DM 321	FOUNDATION-II Fundamental of Disaster Management	3
		<b>17</b>
	English-III	3
	Introduction to Computer	3
	G-V Introduction to Economics	3
	G-VI Introduction to Psychology	3
DM 431	FOUNDATION-III Basic Principles of Disaster Planning and Management	3
		<b>15</b>
	English-IV / Univ. Optional	3
	G-VII Fundamentals of GIS and RS	2+1
	G-VIII Principles of Management	3
DM 441	FOUNDATION-IV Disaster and Development	3
DM 442	FOUNDATION-V Introduction to CBDRM	3
		<b>15</b>
DM 551	FOUNDATION-VI Hydro-meteorological Hazards	3
DM 552	FOUNDATION-VII Geo-Hazards	3
DM 553	FOUNDATION-VIII Biological & Complex Hazards	3
DM 554	MAJOR-I Research Approaches in Disaster Management	3
DM 555	MAJOR-II Applied Geomorphology and Natural Hazards	3
DM 556	MAJOR-III Mainstreaming Gender in Disaster Management	3
		<b>18</b>

DM 561	FOUNDATION-IX Emergency Management	3
DM 562	FOUNDATION-X Disaster Risk Management	3
DM 563	MAJOR-IV Fundamentals of Economics of Disasters	3
DM 564	MAJOR-V Disaster Project Planning and Management	3
DM 565	MAJOR-VI 6. Multi-Hazards Vulnerabilities	3
Proj 569	MAJOR-VII Research Project /Internship	1+2
		<b>18</b>
DM 671	MAJOR-VIII Introduction to Natural Hazards of Pakistan	3
DM 672	MAJOR-IX Disasters Risk and Cities	3
DM 673	MAJOR-X GIS and RS in Disaster Management	2+1
	ELECTIVE-I	3
	ELECTIVE-II	3
		<b>15</b>
DM 681	MAJOR-XI Climate Change and Natural Hazards	3
DM 682	MAJOR-XII Techniques of Hazard Mapping	2+1
DM 683	MAJOR-XIII Practical in Disaster Management	1+2
	ELECTIVE-III	3
	ELECTIVE-IV	3
		<b>15</b>
<b>Total Credit Hours (124-136)</b>		<b>130</b>

**Note:** Students are allowed to select any four electives from the given groups.

### LIST OF ELECTIVE COURSES

Course No.	Course Titles	Credit Hrs.
DM 674a	Climate Change Adaptation and Disasters	3
DM 674b	Structural and Non-Structural Measure in DM	3
DM 674c	Ageing and Disasters	3
DM 674d	Public Private Partnerships for DRR	3
DM 674e	Environment and Hazards Management	3
DM 674f	Humanitarian Crisis Management	3
DM 675a	Child Friendly Disaster Management	3
DM 675b	Earthquake Hazard Risk Reduction	3
DM 675c	Quantitative Techniques for Disaster Management	3
DM 675d	Natural Resources and Disaster	3
DM 675e	Global Regime in Disaster Management	3
DM 684a	Disaster Management Policies	3
DM 684b	Good Governance and Disaster Management	3
DM 684c	Disability and Disasters	3

DM 684d	Health, Hygiene and Sanitation in Disaster Management	3
DM 685a	Psychological Impacts of Disasters	3
DM 685b	Flood Hazard Risk Reduction	3
DM 685c	Basic Engineering Practices in Disaster Management	3
DM 685d	Role of Media in Disaster Management	3
DM 685e	Contingency Planning in Disaster Management	3

## DETAIL OF FOUNDATION COURSES

### Foundation-I

**DM 311**

**Basic Science of Natural Hazards**

**Cr. H. 3**

#### Course Objectives:

- i. To understand the science of natural phenomena.
- ii. To figure out the geomorphic processes.
- iii. To interlink the geomorphic processes with natural hazards.
- iv. To explore the mechanism of natural hazards occurring.

#### Course Contents:

- Scientific Method and Principles of Science
- Universe, Solar System, Earth
- Concept of Time, Space, Scale, Matter, Energy, Form and Geomorphic Processes
- Spheres of the Earth (Litho, Hydro, Bio and Atmosphere)
- Plate Tectonics
- Earth Heat Budget System
  - Earth Albedo
  - Green House Effects
- Gaseous Cycles
- Eco-Systems, Food Chain and Energy Chain
- Hydro-meteorological System
- Weather and Climate
- Natural Hazards
  - Geo-hazards
  - Hydro-meteorological Hazards

#### Recommended Books:

1. HYNDMAN, Donald and Hyndman, David (2010) Natural Hazards and Disasters. Brooks Cole, 3<sup>rd</sup> Revised Edition, Stamford, Connecticut, USA.
2. KREBS, Robert E. (2003) The Basics of Earth Science. Greenwood, Westport, Connecticut, USA.

3. STRAHLER, Alan H. and Strahler, Arthur (2004) Physical Geography: Science and Systems of the Human Environment. John Wiley & Sons, 3<sup>rd</sup> Edition, Hoboken, New Jersey, USA.

## Foundation-II

DM 321

**Fundamental of Disaster Management**

Cr. H. 3

### Course Objectives:

- i. This module provides basic knowledge of hazards, disasters, risks, vulnerability and capacity including natural, climatic and human induced factors and associated impacts.
- ii. On completion of this module, students should understand the nature and types of disasters, associated risks and impacts to these disasters.

### Course Contents:

- Definitions of Natural Hazards and Disasters
- Classification of Natural hazards
- Classification of Disasters
- Disaster risks
- Vulnerabilities
- Capacities
- Hydro-Meteorological Hazards
- Geo Hazards
- Complex and Biological Hazards
- Disaster Risk Reduction and Disaster Risk Transfer

### Recommended Books:

1. BURTON, I.; Kates, R.W. and White, G.F. (1993) The Environment as Hazard, The Guildford Press, London, UK.
2. DAMON, P. C. (2006) Introduction to International Disaster Management. Butterworth-Heinemann, UK.
3. DILLEY, Maxx (2005) Natural Disaster Hotspots: A Global Risk Analysis. World Bank and University of Columbia, US.
4. ELLIOT, J.E. (2006) An Introduction to Sustainable Development. Third Edition. Routledge, London, UK.
5. SMITH, Keith; and Petley, David N. (2009) Environmental Hazards: Assessing Risk and Reducing Disaster. Routledge, London, UK .

## Foundation-III

DM 431

# Basic Principles of Disaster Planning and Management

Cr. H. 3

### Course Objectives:

- i. To know the different phases of disaster management cycle.
- ii. To know the multidisciplinary and multispectral approach in DM.

### Course Contents:

- Introduction to Disaster Planning and Management
- Significance of Disaster Planning and Management
- Disaster Management Cycle
  - Prevention
  - Mitigation
  - Preparedness
  - Impact
  - Response
  - Recovery
  - Development
- Hazards and Resources
- Man and Environment Relationship
- Risk as the product of hazard and vulnerability
- Vulnerability
  - Types of Vulnerability
  - Causes of increasing Vulnerability
- Capacity
  - Types and level of Capacity
  - Triggers for Capacity Development
  - Capacity Dimension
- Elements at Risk
- Planning Process
- Modern Challenges in Disaster Management
- National Disaster Management Policy and Legislation

### Recommended Books:

1. BIRKMANN, J. (2006) Measuring Vulnerability to Natural Hazards: Towards Disaster Resilient Societies. Tokyo, United Nations University Press.
2. BURTON, I.; Kates, R.W. and White, G.F. (1993) The Environment as Hazard, The Guildford Press, London, UK.
3. COLLINS, A.E. (2009) Disaster and Development, Routledge, London, UK.
4. CROUHY, Michel; Galai, Dan and Mark, Robert (2005) The Essentials of Risk Management. The McGraw Hill Co., New York, US.



5. DAMON, P. C. (2006) International Disaster Management. Butterworth-Heinemann.
6. DAMON, P. C. (2006) Introduction to International Disaster Management. Butterworth-Heinemann, UK.
7. DILLEY, Max (2005) Natural Disaster Hotspots: A Global Risk Analysis. World Bank and University of Columbia, US.
8. ELLIOT, J.E. (2006) An Introduction to Sustainable Development. Third Edition. Routledge, London UK.
9. HEWITT, K. (1997) Regions of Risk: A Geographical Introduction to Disaster. Harlow, Longman, New York, US.
10. LEWIS, J. (1999) Development in Disaster-Prone Places, IT Press, London, UK.
11. SMITH, Keith and Petley, David N. (2009) Environmental Hazards: Assessing Risk and Reducing Disaster ,Rourledge .London, UK.

## **Foundation-IV**

**DM 441**

**Disaster and Sustainable Development**

**Cr. H. 3**

### **Objectives:**

At the end of this module, the students shall be able to understand the strong interrelationship existing between Disasters and Sustainable Development.

### **Course Contents:**

- Forging the links between disasters and development
- NDMA Act 2010
- The dilemma of sustainability
- The Concept & Historical Perspective of Sustainable Development
- Medium Term Development Framework
- The Conceptual Relationship between Disasters and Development
- Disasters – A challenge for developing countries and development cooperation
- The Millennium Development Goals
- Disaster Risk Reduction; An Instrument for Achieving Millennium Development Goals
- Disaster and National Development
- Assessing the trade-offs in investing in vulnerability reduction
- National Developmental Plans/ Legislation of Pakistan

### **Recommended Books:**

1. ADAMS, W.M. (2009) Green Development: Environment and Sustainability in a Developing World. Routledge: Oxon.
2. COLLINS, A. E. (2009) Disaster and development. Routledge: London.
3. CUNNY, F. C. (1983) Disasters and Development. Oxford University Press: London.
4. MIDDLETON, N. (1998) Disaster and development: The politics of humanitarian aid. Pluto Press: London.

5. PELLING, M. (2003) Natural Disaster and Development in a Globalizing World. Routledge: London.
6. UN. Department of Humanitarian Affairs. (1996) Disaster and development. UN Dept. of Humanitarian Affairs: Geneva.
7. UNDP. (2004) Reducing Disaster Risk: A Challenge for Development: A Global Report. New York: UNDP.

## Foundation-V

DM 442

# Community Based Disaster Risk Management

Cr. H. 3

### Course Objective:

To make the students understand various participatory approaches/strategies and their application in Disaster Management.

### Course Contents:

- Introduction to CBDRM
- Definition, types and essential elements of community
- Sociological criteria of a good community
- The character of resilient communities
- Importance of community based disaster risk management
- Recognition of the need for community involvement, ownership and participation
- Key points on the CBDRM approach
- Community based disaster risk management process
- Community based risk, needs and damage assessment
- Participatory methods and tools of risk assessment
- Guidelines for good practice in community based disaster risk management
- Participatory disaster risk management planning
- Community managed implementation of risk reduction measures
- Major considerations in undertaking in CBDRM

### Recommended Books:

1. ADPC (2006) Critical Guidelines: Community Based Disaster Risk Management. Asian Disaster Preparedness Centre, Bangkok.
2. ADPC. (2004) Course Material: Course on Disaster Risk Communication at Community Level. Asian Disaster Preparedness Centre, Bangkok.
3. BLAIKIE, P. and T. Cannon, I. Davis and B. Wisner (1994) At Risk: Natural Hazards, People's Vulnerability and Disasters, London, Routledge.
4. GALLACHER, R. (n.d) Participatory Planning Processes: RALA Report No. 200", Food and Agriculture Organization, Rome, Italy.
5. BROWN, Michal Jacob (2006) Building Powerful Community Organizations. Long Haul Press, Arlington, USA.

6. PHILIPS, Rhonda and Pittman, Robert H. (2009). An Introduction to Community Development. Routledge, London.
7. RAFIQ, S. Zari (2003) Community Development: Concept and Practice. Saif Printing Press, Peshawar.

## Foundation-VI

**DM 551**

**Hydro-meteorological Hazards**

**Cr. H. 3**

### Course Objectives:

- i. To understand the Hydro-meteorological processes and to interlink the Hydro-meteorological processes with natural hazards
- ii. To learn about Hydro-meteorological hazards risk and its management.

### Course Contents:

- Introduction to Hydro-meteorological Hazards
- Hydrosphere and Atmospheric Circulations
- Concepts in Meteorology
- Hydro-meteorological Processes and Its Impacts
- Types of Hydro-meteorological Hazards
  - Cyclones
  - Thunderstorms, Windstorm, Hail, Snow Squalls, Cloud Bursting Sand storms, Dust storms etc.
  - Floods/Flash Floods
  - Cold Wave/Intense Cold, Heat Waves/Excessive Heat etc.
  - Tide Waves, Tsunamis/Seismic sea waves,
  - Drought
  - Forest fires/Bush fires
  - Smoke Volcanic Ash
  - Avalanches
- Causes, Intensifying Factors, Impacts, Mitigation and Preventive Measures
- Early Warning System for Hydro-Meteorological Hazards

### Recommended Books:

1. HYNDMAN, Donald and Hyndman, David (2010) Natural Hazards and Disasters. Brooks Cole, 3rd Revised Edition, Stamford, Connecticut, USA.
2. KELLER, Edward A. and DeVecchio, Duane E. (2011) Natural Hazards: Earth's Processes as Hazards, Disasters, and Catastrophes. Prentice Hall; 3 Edition, Upper Saddle River, New Jersey, USA.
3. KHAN, A. N. (2009) Integrating Disaster Management and Climate Change Adaptation into Policy Making. Proceedings of the International Disaster Management Conference -2009, Baragali –

Summer Campus, University of Peshawar, Khyber Pakhtunkhwa, Pakistan.

4. KREBS, Robert E. (2003) The Basics of Earth Science. Greenwood, Westport, Connecticut, USA.
5. SENE, Kevin (2009) Hydrometeorology: Forecasting and Applications. Springer, 1 Edition, Heidelberg, Berlin, Germany.
6. STRAHLER, Alan H. and Strahler, Arthur (2004) Physical Geography: Science and Systems of the Human Environment. John Wiley & Sons, 3 Edition, Hoboken, New Jersey, USA.

## Foundation-VII

**DM 552**

**Geo-Hazards**

**Cr. H. 3**

### Course Objectives:

- i. To understand the plate tectonic mechanism and to interlink the plate tectonics activities and Geo-hazards.
- ii. To learn about Geo-hazards risk and its management.

### Course Contents:

- Introduction to Geo-hazards
- Plate Tectonic and Plate Boundaries
- Global Distribution of Earthquakes and Volcanoes
- Folding, Faulting and Fault Lines
- Types of Geo-hazards
  - Earthquake
  - Volcanoes
  - Tsunami
  - Landslide/Mass wasting
  - Glacial Lake Outburst Floods
  - Associated Hazards
- Causes, Intensifying Factors and Impacts
- Mitigation and Preventive Measures
- Geo-hazards Risk Assessment
- Early Warning System for Geo-hazards

### Recommended Books:

1. COCH, Nicholas K. (2004) Geohazards Natural and Human. Copley Custom Textbooks, Connecticut, USA.
2. HYNDMAN, Donald and Hyndman, David (2010) Natural Hazards and Disasters. Brooks Cole, 3rd Revised Edition, Stamford, Connecticut, USA.
3. KELLER, Edward A. and DeVecchio, Duane E. (2011) Natural Hazards: Earth's Processes as Hazards, Disasters, and Catastrophes. Prentice Hall; 3 Edition, Upper Saddle River, New Jersey, USA.

4. KREBS, Robert E. (2003) The Basics of Earth Science. Greenwood, Westport, Connecticut, USA.
5. STRAHLER, Alan H. and Strahler, Arthur (2004) Physical Geography: Science and Systems of the Human Environment. John Wiley & Sons, 3 Edition, Hoboken, New Jersey, USA.

## Foundation-VIII

DM 553

**Complex & Biological Hazards**

Cr. H. 3

### Course Objectives:

- i. To understand the phenomena biological and complex hazards
- ii. To learn about biological and complex hazards risk and its management.

### Course Contents:

- Introduction to biological and complex hazards
- Definition of Complex/Technological/Man-Made hazards
- Types of complex hazards
  - Complex emergencies/conflicts
  - Famine
  - Displaced populations
  - Industrial accidents
  - Transport accidents
  - Nuclear Hazards
  - Anthropogenic hazards
- Risk assessment of complex hazards
- Risk Reduction measures for complex hazards
- Types of biological hazards
- Transmission of biological hazards
- Epidemics and Pandemics
- Risk assessment of biological hazards
- Controlling exposure to biological hazards
- Occupational Hazards Safety

### Recommended Books:

1. HANSSON, S. O. (2004), Weighing Risks and Benefits', Topoi 23 (2), Pp. 145-52.
2. BALDWIN, C. and Runkle, R. (1967), Biohazards Symbol: Development of a Biological Hazards Warning Signal. Science 158 (798): 264–5.
3. ALEXANDER, David (2002) Principles of Emergency planning and Management. Terra Publishing, University of Minnesota, US.

**Course Objectives:**

- i. To understand Emergency Process and Disaster Consequences
- ii. To know the Emergency Response Mechanism.
- iii. To develop skills for Emergency Response Management.

**Course Contents:**

- Disasters and Emergency Situation
- The nature of Emergency Situation
- Phases of Emergency Management (Mitigation, Preparedness, Response and Recovery)
- Emergency Mitigation (Risk Assessment, Precautionary Measures, Minimizing the Risk)
- Preparedness for Response (Training, Planning, Plan, and Institutions)
- Response
  - Early Warning System,
  - Evacuation,
  - Rapid Need Assessment and Preliminary Damages Assessment
  - Search and Rescue
  - Triage
  - Medical First Aid
  - Fire Fighting
  - Hospital
  - Security
  - Relief
  - Camp Management
- Emergency Response Organizations (Federal, Provisional, District, Community, Individual, NGOs)
- Emergency Operation Centre
- SPHERE Standards

**Recommended Books:**

1. ALEXANDER, David (2002) Principles of Emergency planning and Management. Terra Publishing, University of Minnesota, US.
2. BUCHANAN, Sally (2000) Emergency Preparedness. Preservation Issues and Planning. Chicago, American Library Association
3. GOODMAN, Louis J. and Love Ralph N. (2003) Project Planning and Management: an Integrated Approach. East-West, Mountain View, CA.
4. VAN Der Weide, A. (2003) Project Planning and Management, LEMMA Pub. Corp, New York, USA.
5. WISNER, Ben; Blaikie, P.; Cannon, T. and Davis, I. (2004) At Risk - Natural Hazards, People's Vulnerability and Disasters. Routledge, London, UK. Biological & Complex Hazards

6. THE SPHERE PROJECT (2011) The Humanitarian Charter and Minimum Standards in Humanitarian Response, Practical Action Publishing, Schumacher Centre for Technology and Development, Bourton on Dunsmore, Rugby, CV23 9QZ, United Kingdom. Website : [www.sphereproject.org](http://www.sphereproject.org)

## Foundation-X

DM 562

**Disaster Risk Management**

Cr. H. 3

### Course Objectives

- i. To understand Risk of Disasters and their Consequences
- ii. To know about the risk assessment of disasters
- iii. To familiar with the measures taken for disaster risk reduction.

### Course Contents

- Introduction to Risk of Disasters
- Disaster Risk Management Phases (Recovery, Development, Prevention and Mitigation)
  - Disaster Risk: The Global Problem
  - Understanding the nature of risk
  - Emerging trends in hazards, vulnerability patterns and the impact of disasters
  - Risk and Community: Perception, Determination and Adjustment
  - Building of Resilient Community
  - Risk Assessment
  - Strategies for Risk Management
  - Key Techniques Used in Disaster Risk Assessment
  - Gender Sensitive Risk Assessment
  - Risk Treatment and Management

### Recommended Books

1. ADPC. (2005) A Primer, Disaster Risk Management in Asia 1. ADPC: Thailand.
2. ADPC. (2005) A Primer, Integrated Flood Risk Management in Asia 2. ADPC: Thailand.
3. ALEXANDER, D. (1993) Natural Disasters. UCL Press Ltd: London
4. COLLINS, A. E. (2009) Disaster and development. London: Routledge.
5. CUNNY, F. C. (1983) Disasters and Development. Oxford University Press, London.
6. KHAN, A. N. (2009) Integrating Disaster Management and Climate Change Adaptation into Policy Making. Proceedings of the International Disaster Management Conference -2009, Baragali – Summer Campus, University of Peshawar, Khyber Pakhtunkhwa, Pakistan.

7. MIDDLETON, N. (1998) Disaster and development: The politics of humanitarian aid. Pluto Press: London.
8. SINHA, P.C. (2006) Disaster Mitigation: Preparedness, Recovery and Response. SBS Publishers and Distributors Pvt. Ltd.: New Delhi
9. UN. Department of Humanitarian Affairs. (1996). Disaster and development. UN Dept. of Humanitarian Affairs: Geneva.
10. UNDP. (2004) Reducing Disaster Risk: A Challenge for Development: A Global Report. UNDP: New York.

## **DETAIL OF SUBJECT MAJOR COURSES**

### **MAJOR-I**

**DM 554**

### **Research Approaches in Disaster Management**

**Cr. H. 3**

#### **Course Objectives:**

- i. To understand research in the field of Disaster Management.
- ii. To understand the nature of data in Disaster Management.
- iii. To use statistical techniques for data collection, analysis and interpretation.

#### **Course Contents:**

- Introduction Research Techniques in Disaster Management
- Types of Research
- Basic Elements of Scientific Research Methodology
- Research in the Field of Disaster Management
- Research Process
- Theory and Hypothesis
- Methods/Techniques of Data Collection and Analysis
- Questionnaire Design, Field Survey, Analysis, Interpretation
- Data Classification and Tabulation
- Sample and Sampling
- Measures of Central Tendency
- Measures of Dispersion
- Comparisons
- Computer Based Statistics (SPSS16/MS Excel etc.)
- Writing a Research Proposal

#### **Recommended Books:**

1. BIRKMANN, J. (2006) Measuring Vulnerability to Natural Hazards: Towards Disaster Resilient Societies. Tokyo, United Nations University Press.
2. CRESWELL, John W. (2009) Research Design: Qualitative, Quantitative, and Mixed Methods Approaches. Sage Publications



3. HOWARD, K. ef; Sharp, J.A. (1983) The Management of a Student Research Project. Gower Publishing Company, UK.
4. JOHN, W. Creswell (2009) Research Design: Qualitative, Quantitative, and Mixed Methods Approaches.
5. MARSHALL, Catherine; Rossman, Gretchen B. (2006) Designing Qualitative Research. Edition 4, Sage Publications, Los Angeles, US.
6. MAXWELL, Joseph A. (2005) Qualitative Research Design: An Interactive Approach. Edition 2, Sage Publications, Los Angeles, US.
7. MYERS, Jerome L. and Well, Arnold D. (2002) Research Design & Statistical Analysis. 2nd Edition, Routledge, London, UK.

## MAJOR-II

DM 555

### Applied Geomorphology and Natural Hazards

Cr. H. 3

#### Course Objectives:

- i. To know the geomorphological processes and extreme natural events.
- ii. To interlink the geomorphic processes with natural hazards
- iii. To understand the man and environment dynamic relationship.
- iv. To apply the geomorphic techniques in the study of natural hazards.

#### Course Contents:

- Introduction to Geomorphology
- Geomorphic Processes
- Classification of Geomorphic Processes
- Endogenous Hazards
  - Earthquakes
  - Volcanism
- Exogenous Hazards
  - Rivers and Flood Plains and Flooding
  - Drought
  - Glacial and Associated Hazards
  - Soil Erosion by Water and Wind
  - Weathering, Causes, Implication
  - Desertification, Causes and Implication
  - Mass Movement Hazards
- Geomorphological Mapping
- Geomorphology and Environment
- Geomorphology in Disaster Management

#### Recommended Books:

1. ALEXANDER, David (2002) Principles of Emergency planning and Management. Terra Publishing, University of Minnesota, US.

2. ALLISON, Robert (Edit) (2002) Applied Geomorphology: Theory and Practice. Brooks Cole, Stamford, Connecticut, USA.
3. COOKE, R. U. and Doornkamp, J. C. (1990) Geomorphology in Environmental Management (New Edition). Clarendon Press Oxford.
4. HYNDMAN, Donald and Hyndman, David (2010) Natural Hazards and Disasters. Brooks Cole, 3rd Revised Edition, Stamford, Connecticut, USA.
5. KHAN, A. N. (2009) Integrating Disaster Management and Climate Change Adaptation into Policy Making. Proceedings of the International Disaster Management Conference -2009, Baragali – Summer Campus, University of Peshawar, Khyber Pakhtunkhwa, Pakistan
6. VERSAPPER H.T. (1983) Applied Geomorphology: Geomorphological Survey for Environmental Development. Elsevier, New York, USA.

### MAJOR-III

DM 556

## **Gender Mainstreaming in Disaster Management**

Cr. H. 3

### **Course Objective:**

To know the impacts of disaster on women and to study the contribution of women in disaster management.

### **Course Contents:**

- Gender and gender relations in disasters
- Women in society
- Perspective of gender: A missing element in disaster
- Gender inequality, vulnerability and disaster
- Gender Specific Needs and Issues
- Differential impact of disaster on women in different life cycle stages
- Role of women in disaster management
- Women involvement in reconstruction and development phase following an emergency and/or disaster
- Psychosocial considerations: prevention, mitigation and preparedness
- Community mobilization through women
- Case studies of women responding to disaster

### **Recommended Books:**

1. ANDERSEN, ML. and Dana, Hysock (2006) Thinking about Women: Sociological Perspectives on Sex and Gender. Allen & Bacon, New York.
2. ARIYABANDU, M. M. and Wickramasinghe, Maithree. (2005) Gender Dimension in Disaster. Raj Press, New Delhi.

3. ENARSON, Elaine and Morrow Betty H. (2000). The Gendered Terrain of Disaster: Through Women's Eyes. International Hurricane centre. USA
4. KATHY, D., Mary, E. and Lorber, J (2006) Handbook of Gender and Women's studies, Sage, UK
5. MYERS, Mary (1994). Women and Children first. Introducing gender strategy in disaster preparedness, Oxfordshire: Carfax publishing limited.
6. PHILLIPS, B.D. and Morro, B.H. (2008) Women and Disasters. Bloomington: Xlibris Corporation (United States).

## **MAJOR-IV**

**DM 563**

**Economics of Disasters**

**Cr. H. 3**

### **Objectives:**

- i. This module will enable the students to analyse the broad spectrum of disaster management from economic perspective.
- ii. To help the students to understand the economic impacts of disasters at local, regional, national and international level.

### **Course Contents:**

- Understanding the economic and financial impacts of disasters
- Economic Impacts of Disasters in Pakistan
- Nature of Economic Aid after Disasters
- Insurance Against Disaster Losses
- Financial and economic tools
- Effects of Disasters on Capital Accumulation
- Economic Resilience to Disasters
- Public Finance and Disasters
- Economic cost of Disasters
- Financing the Cost of Future Disasters
- Significance of Insurance in risk reduction across developing countries
- Making Disaster Risk Reduction and Insurance Work Together.

### **Recommended Books:**

1. BENSON, C. and Clay, E.J (2004) Understanding the Economic and Financial Impacts of Natural Disaster, Disaster Risk Management Series No.4: The World Bank. Washington D.C.
2. GOODWIN, B.K. and Smith, V.H. (1995) The Economics of Crop Insurance and Disaster Aid. The AEI Press: Washington, D.C.
3. GROSSI, P. and Kunreuther, H. (2005) Catastrophe Modeling: A New Approach to Managing Risk. Springer: USA.
4. KERN, W. (2010) The Economics of Natural and Unnatural Disasters. W.E. Upjohn Institute for Employment Research: Michigan.

5. NATIONAL Research Council. (1999) The Impacts of Natural Disasters: A Framework for Loss Estimation: National Academy Press: Washington DC, USA.
6. OWEN, B. M., Argue, D.A., Furchtgott-Roth, H.W., Hurdle, G.J. and Mosteller, G. (1995) The Economics of a Disaster: The Exxon Valdez Oil Spill. Greenwood Publishing Group, Inc: USA.
7. WB (2010) Natural Hazards Unnatural Disasters: The Economics of Effective Prevention. The World Bank: Washington DC. USA.
8. YESCOMBE, E. R. (2007) Public-Private Partnerships: Principles of Policy and Finance. Butterworth Hienemann: UK.

## **MAJOR-V**

**DM 564**

**Disaster Project Management**

**Cr. H. 3**

### **Objectives:**

This module will groom the students as project managers; whereby they will be able to understand the functional requirements of Projects.

### **Course Contents:**

- Introduction to Project Cycle
- Project Management- Basic concepts
- Project Management International Standards
- Project planning and Documentation
- Project Management in NGOs
- Project Management Methodologies
- Project Management Body of Knowledge (PMBOK)
  - Project Management Knowledge Areas
- Project Scheduling & Critical Path Method
- Project Selection Models and Types
  - Decision Aiding Models
  - Criteria for Project Selection
- Types of Project Selection Models
- Project Risk Management
- Change Management
- Monitoring and Evaluation
- Introduction to Project Management Software
  - MS Project Office / Primavera

### **Recommended Books:**

1. ALEXANDER, D. (2002) Principles of Emergency planning and Management. Terra Publishing: Minnesota, US.
2. BUCHANAN, S. (2000) Emergency Preparedness. Preservation Issues and Planning. American Library Association: Chicago, US.

3. GOODMAN, L. J. and Love, R. N. (2003) Project Planning and Management: An Integrated Approach. East-West Center: CA.
4. VAN Der Weide, A. (2003) Project Planning and Management, LEMMA.
5. WISNER, Ben; Blaikie, P.; Cannon, T. and Davis, I. (2004) At Risk - Natural Hazards, People's Vulnerability and Disasters. Routledge: London, UK.

## MAJOR-VI

**DM 565**

**Multi-Hazards Vulnerabilities**

**Cr. H. 3**

### Course Objectives:

- i. To familiarize the students with Physical, Economic, Social and Attitudinal Vulnerabilities in context of different hazards.
- ii. To understand the dynamics of Geo-spatial and Multi-hazards Vulnerabilities

### Course Contents:

- Introduction to Multi-Hazards Vulnerabilities
- Hazards: Types, Intensity, Density and Frequency
- Vulnerability: Types, Root and Underlying Causes
- Geo-Spatial Characteristics of Hazards and Vulnerability
- Flash, Riverine and Coastal Floods and associated Physical, Economic, Social and Attitudinal Vulnerabilities
- Earthquake and associated Physical, Economic, Social and Attitudinal Vulnerabilities
- Drought and associated Physical, Economic, Social and Attitudinal Vulnerabilities
- Desertification and associated Physical, Economic, Social and Attitudinal Vulnerabilities
- Mass Movements and associated Physical, Economic, Social and Attitudinal Vulnerabilities
- GLOFs and associated Physical, Economic, Social and Attitudinal Vulnerabilities
- Geo-Spatial Analysis of Multi-hazards Vulnerabilities
- Multi-hazards Vulnerabilities and Resilience

### Recommended Books:

1. DISASTER Risk Management and Vulnerability Reduction  
[www.adpc.net/infores/adpc-documents/PovertyPaper.pdf](http://www.adpc.net/infores/adpc-documents/PovertyPaper.pdf)
2. HANDBOOK: International Federation of Red Cross and Red Crescent Societies. What is VCA? An introduction to vulnerability and capacity assessment.
3. INTERNATIONAL Workshop on Disaster Risk Mitigation: Potential of Micro-Finance for Tsunami Recovery, Dhar Chakrabarti, P. G., & Bhat, M. R. (2006) Micro-finance and disaster risk reduction: Proceedings of International Workshop on Disaster Risk Mitigation: Potential of Micro-

Finance for Tsunami Recovery New Delhi, October 14-15, 2005. New Delhi: National Institute of Disaster Management in association with Knowledge World.

4. MULTI Hazard Risk Assessment using GIS  
[www.adpc.net/audmp/rlw/themes/th1-westen.pdf](http://www.adpc.net/audmp/rlw/themes/th1-westen.pdf)
5. SMITH, Keith and Petley, David N. (2009) Environmental Hazards: Assessing Risk and Reducing Disaster. 5th Edition, Routledge, London, UK.
6. UNITED States. (2002) Catastrophe insurance risks The role of risk-linked securities and factors affecting their use. [Washington, D.C.]: U.S. General Accounting Office
7. VULNERABILITY and Risk Assessment – Disaster Management Training Programme [www.iaemeuropa.terapad.com/.../UN%20DMTP%20-%20Vulnerability.pdf](http://www.iaemeuropa.terapad.com/.../UN%20DMTP%20-%20Vulnerability.pdf)

## **MAJOR-VIII**

**DM 671**

**Natural Hazards of Pakistan**

**Cr. H. 3**

### **Course Objectives:**

- i. To familiarize with physiography of Pakistan.
- ii. To understand the nature, causes, consequences and remedies of the natural hazards occurring in Pakistan.

### **Course Contents:**

- Introduction to Natural Hazards and Disasters
- Physiography of Pakistan
- Climate of Pakistan
- Ecological Regions of Pakistan
- Seismic Hazards Zone of Pakistan
- Major Natural Hazards of Pakistan
  - Floods
  - Earthquakes
  - Tsunami
  - Landslides
  - Desertification
  - Drought
  - Cyclone
  - Snow Avalanches
  - Glacial Hazards
  - Salinization
  - Heat and Cold Waves
  - Sea Water Intrusion
- Future Disaster Trends in Pakistan

- Disasters Management Policies in Pakistan

### **Recommended Books:**

1. AHMAD, N. and Qureshi, I. A. (1995) Disaster Management in Punjab: A study of flood management in district Jhelum. Pakistan Academy for Rural Development, Peshawar.
2. BIRKMANN, J. (2006) Measuring Vulnerability to Natural Hazards: Towards disaster resilient societies. Tokyo, United Nations University Press.
3. FOSTER, H. D. (1980) Disaster Planning: The preservation of life and property. Berlin, Springer Verlag.
4. HEWITT K. (1997) Regions of Risk: A Geographical introduction to disaster, Harlow, Longman.
5. KHAN, A.N. (1996) Planning for Reduction of Flood Hazard. Proceeding of Pakistan Geographical Association, Bahawalpur Conference.
6. McENTIRE, D. (2007) Disaster Response and Recovery: New Jersey, Oxford, UK.

## **MAJOR-IX**

**DM 672**

**Disasters Risk and Urbanization**

**Cr. H. 3**

### **Course Objectives:**

- i. To know about city structure and associated problems.
- ii. To understand the process of urbanization.
- iii. To have knowledge of urban hazards and risk reduction measures.

### **Course Contents:**

- Introduction to Disasters Risk and Urbanization
- City Structure
- Population distribution in city and social classes
- Urbanization (Definition, Causes, Impacts)
- Problems of Urbanization
- Hazards in urban environment.
  - Fire, Chemical Hazards, nuclear, epidemics, flood, earthquake, windstorm, hailstorm etc.
- Vulnerabilities in urban areas.
  - Population distribution, Housing structure, Building codes, Accessibility, Emergency services etc.
  - Geology, hydrology, drainage, soil etc.
- Risk Reduction Measures.
  - Improvement of civic services.
  - Emergency response mechanism.
  - Hazard specific measures.

### **Recommended Books:**

1. FERGUSON, Ronald F. and Dickens, William T. (1999) Urban Problems and Community Development. Brookings Institution Press.
2. KHAN, A. N. (2009) Integrating Disaster Management and Climate Change Adaptation into Policy Making. Proceedings of the International Disaster Management Conference -2009, Baragali – Summer Campus, University of Peshawar, Khyber Pakhtunkhwa, Pakistan
3. PELLING, Mark and Wisner, Ben (2008) Disaster Risk Reduction: Cases from Urban Africa. Earthscan Publications Ltd., London, UK.
4. PUGH, Cedric (1996) Sustainability the Environment and Urbanisation. Earthscan, London, Uk
5. SHAW, Rajib; Srinivas, Hari; and Sharma, Anshu (2009) Urban Risk Reduction: An Asian Perspective. Community, Environment and Disaster Risk, Emerald Group Publishing Limited.

### **MAJOR-X**

DM 673

## **Geographic Information System and Remote Sensing in Disasters Management**

Cr. H. 2+1

### **Objectives:**

- i. To enhance the skills of students in understanding of GIS and RS.
- ii. To enable the students to develop, interpret and analyse the hazards maps.

### **Contents:**

- Important of spatial data in disaster management
- Acquisition of GIS and Remote Sensing data for disaster management
- Data collection techniques
- Application of GIS and Remote Sensing data for disaster management
- Role of GIS and RS in Mitigation and Preparedness
- Role of GIS and RS in Disaster Response and Recovery
- Role of GIS and RS in Disaster Risk Assessment
- Preparation of different thematic maps; exercises on creating maps for different disasters.

### **Recommended Books:**

1. ARONOFF, S. (2005) Remote Sensing for GIS Managers: ESRI Press, New York.
2. CARLETON, A. (1990) Satellite Remote Sensing in Climatology: CBS Publishers and Distributor, New Delhi.
3. CARRARA and Guzitti (2001) Geographical Information System in Assessing Natural hazards: Dordrecht, Kluwer.



4. LILLESAND, T. M. (2006) Remote sensing and image interpretation: John Wiley & Sons, Inc. New York.
5. MASSER, I. and Blakemore, M. (1991) Handling Geographical Information: Methodology and Potential Applications. Longman. New York.

## **MAJOR-XI**

**DM 681**

**Climate Change and Natural Hazards**

**Cr. H. 3**

### **Course Objectives:**

- i. To understand the process of climate change.
- ii. To interlink the natural hazards and climate change.

### **Course Contents:**

- Introduction to Climate Change and Natural Hazards
- Weather and Climate
- Global Climatic Regions
- Role of Oceans
  - Surface Current, Carbon sink
  - El-Nino and La-nina Effect,
- Hydro-Meteorological System
- Causes of Climate Change (Natural and Anthropogenic)
- Impacts of Climate Change
- Global Warming
- Extreme Weather Events
- Hydro-meteorological Hazards and Disasters
- Global Distribution of Hydro-meteorological Disasters

### **Recommended Books:**

1. BURROUGHS, William James (2007) Climate Change: A Multidisciplinary Approach. 2nd Edition, Cambridge University Press, London, UK.
2. GAVIN, Schmidt and Wolfe, Joshua; Jeffrey, D. Sachs (2009) Climate Change: Picturing the Science, Earthscan, London, UK.
3. KININMONTH, William (2004) Climate Change: A Natural Hazard. Multi-Science,
4. SMITH, Keith; Petley, David N. (2009) Environmental Hazards: Assessing Risk and Reducing Disaster. 5th Edition, Routledge, London, UK.

**Course Objectives:**

- i. To know about the basic elements of a map.
- ii. To understand the hazard variables.
- iii. To learn methods and techniques of hazard mapping.

**Course Contents:**

- Introduction to Techniques of Hazards Mapping
- Maps (Definition, Importance and Use)
- Types of Maps (Scale, Purpose and Content)
- Basic Elements of a Map
- Types and variables of Hazards
- Map Making Techniques
  - Sketch Map
  - Drawing Tools
  - Surveying Tools
  - Computer Aided Cartography
  - GIS
  - Multi-Tool Mapping
- Limitation of Hazards Mapping

**Recommended Books:**

1. CRAMPTON, Jeremy W. (2010) Mapping: A Critical Introduction to Cartography and GIS. Wiley-Blackwell; 1 Edition, Hoboken, New Jersey, USA.
2. MONMONIER, Mark (1998) Cartographies of Danger: Mapping Hazards in America. University of Chicago Press, 1 Edition, USA.
3. PECKHAM, Robert Joseph and Jordan, Gyozo (2007) Digital Terrain Modelling: Development and Applications in a Policy Support Environment. Series: Lecture Notes in Geoinformation and Cartography, Springer, Berlin, Germany.
4. PETERSON, Gretchen N. (2009) GIS Cartography: A Guide to Effective Map Design. Taylor and Francis, CRC Press; 1 Edition, USA.
5. ROBINSON, H.; Morrison, Joel L.; Muehrcke, Phillip C. and Kimerling, A. J. (1995) Elements of Cartography. J. Wiley Co., New York, USA.

## MAJOR-XIII

DM 683

**Practical Exercises in Disaster Management**

Cr. H. 1+2

### Objectives:

- I. To provide to the students an understanding of various tools and techniques used for disaster risk assessment.
- II. To train the students through practical activities of ERM for conducting emergency response activities in case of various disasters.

### Course Contents:

- Map reading
  - Topographic Maps
  - Weather Maps
  - General Maps
- Distance, shape and area analysis on a map
- Drainage Pattern analysis
- Contour and Slope analysis
- Hazard, Risk and Mapping
- Basics of Emergency Response
- Search and Rescue (Types, equipment and training)
- Fire Fighting
  - Types of Fire
  - Fire Prevention
  - Types of Fire Extinguishers and its application
- First Aid
  - Vital Signs
  - Basic Life Support (ABC + CPR)
  - Wounds and its Types: Pre-Hospital Management.
  - Basic Guidelines for Management of Fractures
  - Burn Injuries
  - Safe Transportation of Patient
  - Foreign Body Airway Obstruction (FBAO)
  - First aid for Climatic Injuries

### Recommended Books:

1. ALEXANDER, David (2002) Principles of Emergency planning and Management. Terra Publishing, University of Minnesota, US.
2. BUCHANAN, Sally (2000) Emergency Preparedness. Preservation Issues and Planning. Chicago, American Library Association
3. ABRAMS, J. and Hall, P. (2006) Else/Where: Mapping — New Cartographies of Networks and Territories. University of Minnesota Design Institute, Minnesota.
4. BREWE, A. C. (2005) Designing Better Maps: A Guide for GIS Users. ESRI Press. P. 220.

5. BUCHANAN, Sally (2000) Emergency Preparedness. Preservation Issues and Planning. Chicago, American Library Association

## DETAIL OF ELECTIVE COURSES

### Elective (Semester 07)

DM 674a

**Climate Change Adaptation and Disasters**

Cr. H. 3

#### Course Objectives:

- i. To understanding current issue of climate variability and change.
- ii. To explore relation between climate change adaptation and disaster risk management.

#### Course Contents:

- Introduction to Climate Change Adaptation
- Climate change and climate variability
- Risk of Disasters and Climate Change
- Major impacts of climate change: Agriculture, Water resources, Forestry, Biodiversity, human health and hydro-meteorological disasters
- Climate Change and Extreme Hydro-meteorological Events
- Climate Change and Vulnerabilities
- Assessing the impacts and vulnerabilities to climate change and adaptation Climate Change Mitigation
- Climate Change Adaptations
- Local coping strategies, indigenous knowledge in climate change adaptation
- Climate Change adaptation needs in Pakistan-agriculture, water, forestry, biodiversity, health etc.

#### Recommended Books:

1. BURROUGHS, William James (2007) Climate Change: A Multidisciplinary Approach. 2nd Edition, Cambridge University Press, UK.
2. COOKE, R. U. and Doornkamp, J. C. (1990) Geomorphology in Environmental Management. Clarendon Press Oxford.
3. GOVERNMENT of Pakistan (GOP) (1981) Environmental Profile of Pakistan. Environment and Urban Affairs Division, Government of Pakistan, Islamabad.
4. KININMONTH, William (2004) Climate Change: A Natural Hazard. Multi-Science,
5. LEHMANN, Steffen (2010) The Principles of Green Urbanism: Regenerating the Post-Industrial City. Earthscan, London, UK.

6. SABH, M. I. and Murty, S. (Eds.) (1988) Natural and Manmade Hazards. Academic Publisher Group.
7. KHAN, A. N. (2009) Integrating Disaster Management and Climate Change Adaptation into Policy Making. Proceedings of the International Disaster Management Conference -2009, Baragali – Summer Campus, University of Peshawar, Khyber Pakhtunkhwa, Pakistan.
8. INTERGOVERNMENTAL Panel on Climate Change (IPCC) (2013) Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation. Cambridge University Press 32 Avenue of the Americas, New York, NY 10013-2473, USA

### **Elective (Semester 07)**

<b>DM 674b</b>	<b>Structural and Non-Structural Measures in DRM</b>	<b>Cr. H. 3</b>
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#### **Course Objectives:**

- i. To understand floods and landslides hazards and disaster risk reduction.
- ii. To know about risk reduction techniques and measures for flood and landslides.

#### **Course Contents:**

- Introduction to Structural and Non-Structural Measures in DRM
- Floods, Earthquakes, Landslides, Windstorms, Blasts, and Desertification
- Structural Measures
  - Channelization: Dredging, Straightening,
  - Construction of protective structures: Spurs, Marginal bund or levees, Embankments
  - Relief or by pass channel
  - Construction of reservoirs and dams
  - Retaining walls (gabion, stone masonry. PCC, RCC, vegetated concrete block, vegetated crib etc.),
  - Diversion channels, Surface drains, Subsurface drains.
- Soil Bioengineering Measures
- Biological measures
- Non-Structural Measures

#### **Recommended Books:**

1. ANNON, (1992) Soil Bioengineering for upland Slopes Protection and Erosion Protection. Engineering Field Handbook, United States Department of Agriculture.
2. ANNON, (1997) Mitigation earthquake induced landslide hazard. Division of Mines and Geology Department of Conservation.

3. BARKER, D.H. (1995) *Vegetation and Slopes: Stabilization, Protection and Ecology*. Thomas Telford Publishing Company, New York, USA.
4. CHANDLER, R.J. (1995) *Slope Stability Engineering*. Institution of Civil Engineers, Thomas Telford Publishing Company, New York, USA.
5. SHAH, B. H. (2008) *Field Manual on Slope Stabilization*. Environmental Recovery Programme For The Earthquake Areas, UNDP Pakistan publication, Crisis Prevention & Recovery Unit (CPRU), House # 124 Street # 11, E-7 Islamabad

### **Elective (Semester 07)**

**DM 674c**

**Ageing and Disaster**

**Cr. H. 3**

#### **Course Objective:**

The objective of this course is to understand the concept of aging and see the role of senior people in disaster management.

#### **Course Content:**

- Introduction to Ageing
- Social Ageing and the Life Course Perspective
- Cultural Images of Ageing
- Theoretical Analysis of ageing
- Madrid International Plan of Action on Ageing, 2002
- Employment Old Age Benefit Institution
- Problems of Old Age People
- Problem of older People in disaster
- Disasters and the Vulnerability of Older Populations
- Displacement, separation and return
- Capacities and contribution social capital during disaster
- Senior People and Sphere Standards
- Case Studies: Help Age older people associations in community disaster risk reduction.

#### **Recommended Books:**

1. COX, Harold G. (2004) *Annual Editions: Aging 04/05*. McGraw- Hill, Inc., Guilford, CT.
2. HELPAGE International (2007) *Older People Associations in Community Disaster Risk Reduction*, Available from [www.helpage.org](http://www.helpage.org).
3. LASSEY, William R. and Marie L. Lassey (2001) *Quality of Life for Older People: An International Perspective*. Upper Saddle River, NJ: Prentice Hall, Inc.
4. QUADAGNO, Jill (2008) *Ageing and the Life Course: an Introduction to Social Gerontology*, McGraw-Hill.

5. TICHEHURST, James F., Vaughn J. Carr and Terry J. Lewin. (1996) The psychological impact of an earthquake on the elderly.” International Journal of Geriatric Psychology, 943-951,
6. UNITED Nations (2002) The Madrid International Plan of Action on Ageing, [Online] Available at [http://www.un.org/esa/socdev/ageing/madrid\\_intlplanaction.html](http://www.un.org/esa/socdev/ageing/madrid_intlplanaction.html)

### **Elective (Semester 07)**

**DM 674d**

## **Public Private Partnerships for Disaster Risk Reduction**

**Cr. H. 3**

### **Objectives:**

This module shall enable the students to understand the significance challenges of Public Private Partnership for DRR.

### **Course Contents:**

- Introduction to the Public Private Partnerships
- Public Private Partnership for Disaster Risk Reduction
- Private sector involvement in DRR
- The business case for corporate sector involvement in DRR
- The role of the private sector in DRR
- Case studies of private sector involvement in DRR activities
- Current legislative and institutional framework for PPPs for DRR
- Recommendations for strengthening partnerships
- Way forward/Evolving Concepts in PPP for DRR with special reference to Pakistan

### **Recommended Books:**

1. AKINTOYE, A., Beck, M. and Hardcastle, C (ed). (2003) Public-Private Partnerships: Managing Risks and Opportunities. Blackwell Science Limited: Oxford, UK.
2. DAVIDSON, N.M. and Malloy, R.P (2009) Affordable Housing and Public-Private Partnerships. Ashgate Publishing Ltd: England.
3. YESCOMBE, E. R. (2007) Public-Private Partnerships: Principles of Policy and Finance. Butterworth Hienemann: UK.
4. GOODWIN, B.K. and Smith, V.H. (1995) The Economics of Crop Insurance and Disaster Aid. The AEI Press: Washington, D.C.
5. PATON, D. and Johnston, J. (2006) Disaster Resilience: An Integrated Approach. Charles C. Thomas Publisher, Ltd. USA.

### **Elective (Semester 07)**

**DM 674e**

## **Environment and Hazards Management**

**Cr. H. 3**

### **Course Objectives:**

- i. To know the basic components of environment.

- ii. To understand the relationship between Man and Environment.
- iii. To interlink environmental problems with natural hazards.

#### Course Contents:

- Introduction to Environment and Natural Hazards
- Environment and their Components
- Sustainable Use of Resources for DRR
- Spheres of the Earth (Litho, Hydro, Bio and Atmosphere)
- Earth Heat Budget System
- Green House Effects
- Global Warming
- Type of Environments
- Eco-Systems, Food Chain and Energy Chain
- Environment and Resources
- Economic Activities & Environment
- Pollution and Disasters
- Environmental Hazards

#### Recommended Books:

1. KHAN, Fazle Karim (1991) A Geography of Pakistan: Environment, People and Economy. Oxford University Press – Pakistan.
2. PARK, Chris (2001) The Environment: Principles and Applications. 2nd Edition, Routledge, UK.
3. PRAMANIK, M. A. H. (1993) Impacts of Disasters on Environment & Development: International Cooperation. Diane Publishing Co.,
4. SMITH, Keith and Petley, David N. (2009) Environmental Hazards: Assessing Risk and Reducing Disaster. 5th Edition, Routledge, London, UK.
5. WOODS, Michael and Woods, Mary B. (2008) Environmental Disasters. Minneapolis: Lerner Publications Company.

#### Elective (Semester 07)

DM 674f

**Humanitarian Crisis Management**

**Cr. H. 3**

#### Course Objective:

- i. To understand the dynamics of conflict areas involved in humanitarian crises management. T
- ii. To appreciate the challenges of humanitarian aid interventions for individuals and organisations in conflict areas due to internal (for example, civil war and ethnic disputes) or external factors (for example war in Afghanistan and Palestine).

#### Course Contents:

- Understanding humanitarianism: why the world has responsibility to help



- Poor competing against poor to become projects: how humanitarian organisations choose where to work and where not to work; who gets international aid and how much
- Challenges of humanitarian organisations working in conflict areas: how to be perceived as neutral to stay safe and undertake development
- How to ensure human security, vulnerability reduction and sustainability in humanitarian crises
- The role of mediation in managing international crises
- Best practices in humanitarian crises management
- Practicing humanitarianism: difference between rhetoric and reality
- Responding to an international call for humanitarian crises as a disaster response manager
- Studying World Health Organisation practice as a case in point

### **Recommended Books:**

1. THOMAS, G. Weiss, Humanitarian Intervention, Polity Press, 2007, Cambridge
2. MONIKA, Krause, The Good Project: Humanitarian Relief NGOs and the Fragmentation of Reason, University Of Chicago Press, 2014, Chicago
3. VICTOR, Asal, David Quinn, Jonathan Wilkenfeld, Kathleen Young, Mediating International Crises (Routledge Advances in International Relations and Global Politics), Routledge, 2006, London
4. Managing World Health Organisation Response in the field, [http://www.who.int/hac/techguidance/tools/manuals/who\\_field\\_handbook/content/en/](http://www.who.int/hac/techguidance/tools/manuals/who_field_handbook/content/en/) accessed on March 6, 2014

### **Elective (Semester 07)**

**DM 675a**

**Child Friendly Disaster Management**

**Cr. H. 3**

### **Course Objectives:**

- i. To understand the situation of children in Pakistan and at the global level.
- ii. To explore how disaster affect the children.
- iii. To find out the contribution of children in disaster preparedness and management.

### **Course Contents:**

- Definition of Child
- Violence against Children
- Vulnerability of Children to disasters
- Direct and Indirect impacts of Disaster on Children
- Specific Needs of Children During Disaster
- International Conventions on the rights of children in emergency
- Guidelines for child friendly disaster management and response

- Responding to Child Trauma
- Mainstreaming DRR Education into School curricula
- School Emergency Planning and Management
- Case studies on Child Friendly Disaster Management

### **Recommended Books:**

1. ADPC (2007) Child Focused Disaster Risk Reduction, Module 6: Community Disaster Risk Reduction Implementation, 16th Community Based Disaster Risk Management Course, Bangkok.
2. BERTI, Stefano (2003) Rights of the Child in Pakistan, World Organization against Torture, Geneva.
3. CAMERON, C. and Davies G. N.(2010). Children and Disaster Risk Reduction in Asia and the Pacific: A way Forward, [Online] Available at [www.unicef.org/crc/](http://www.unicef.org/crc/)
4. MURTHY and Josephine (2006) A Study on Non-Discrimination in the Tsunami Rehabilitation Programme in India, Save the Children Tsunami Rehabilitation Programme in India
5. SPARC (2010) State of Children in Pakistan, Society for the Protection of Rights of Child, Islamabad.

### **Elective (Semester 07)**

**DM 675b**

**Earthquake Hazard Risk Reduction**

**Cr. H. 3**

### **Course Objectives:**

To understand the nature, causes, consequences and remedies of the earthquake hazard.

### **Course Contents:**

- Introduction to Earthquake Hazard Management
- Earthquake Seismology
- Earthquake Hazard and Vulnerabilities
- Earthquake and Associated Secondary Hazards
- Seismic Zonation and Micro-Zonation with reference to Pakistan
- Earthquake Hazard Reduction Measures (Structural and Non-Structural)
- Structure, Design and Material of the Buildings
- Preparedness (Individual, Family, Community, Early Warning System, Institutions, Awareness etc.)

### **Recommended Books:**

1. ALCÀNTARA-Ayala, Irasema and Goudie, Andrew (2010) Geomorphological Hazards and Disaster Prevention. Cambridge University Press, UK.
2. ANDRÉ Filiatrault (2002) Elements of Earthquake Engineering and Structural Dynamics. Presses Internationaels Poltechnique, France.

3. COBURN, Andrew and Spence Robin (2002) Earthquake Protection. John Wiley & Sons Ltd., New York, US.
4. DOWRICK, David (2003) Earthquake Risk Reduction. John Wiley & Sons Ltd., New York, US.
5. KHAN, A. N. (2009) Integrating Disaster Management and Climate Change Adaptation into Policy Making. Proceedings of the International Disaster Management Conference -2009, Baragali – Summer Campus, University of Peshawar, Khyber Pakhtunkhwa, Pakistan
6. PRELIMINARY Damage and Needs Assessment Report of Pakistan 2005 Earthquake (2005). Prepared by Asian Development Bank and World Bank, Islamabad, Pakistan.

### **Elective (Semester 07)**

**DM 675c**

## **Quantitative Techniques for Disaster Management**

**Cr. H. 3**

### **Objectives:**

To give students hands on experience in quantitative techniques that can be used in Disaster Management.

### **Course Contents:**

- The Basic Concepts
- Introduction to Quantitative Analysis
- Probability Concepts and Applications
- Decision Analysis
- Regression Models
- Forecasting Models
- Linear Programming Models
- Introduction to Global Circulation Models (GCM); Climate Change

### **Recommended Books**

1. BROWNSON, R. (1983) Operations Research Schaum's Outline Series. McGraw Hill Book Co.
2. CHAUDHRY, S.M. (1996) Introduction to Statistical Theory (Part I-II). Ilmi Kutab Khana: Lahore
3. CRESWELL, J.W. (2009) Research Design: Qualitative, Quantitative and Mixed Methods Approaches. Sage Publications, Inc.: USA.
4. KOUTSOYIANNIS, A. (1977) A Theory of Econometrics. McMillan
5. RENDER, B., Stair, R.M., Hanna, Jr. M.E., and Badri, T.N. (2009) Quantitative Analysis for Management (Tenth Edition). Dorling Kindersley (India) Pvt. Ltd: India
6. SALVATORE, D. (1995) Managerial Economics in a Global Economy. McGraw-Hill Book Co., New York, USA.

## **Elective (Semester 07)**

**DM 675d**

**Natural Resources and Disaster**

**Cr. H. 3**

### **Course Objectives:**

- i. To know about the natural resources and its utilization.
- ii. To explore the relationship of natural resources utilization and natural hazards.
- iii. To understand the sustainable use of resources and disaster risk reduction.

### **Course Contents:**

- Introduction to Natural Resources and Disaster management
- Natural Resources and its Classification
- Preservation, Conservation and Restoration of Natural Resources
- Natural Resources Policies and its Management
- Natural Resources and Human Environment Interaction
- Natural Resources and Development
- Ecological Balance Systems
- Natural Resources and Natural Hazards
- Impacts of Disasters on Natural Resources

### **Recommended Books:**

1. BREBBIA C. A. (2006), Management of Natural Resources, Sustainable Development and Ecological Hazards. Conti, M. E. and Tiezzi, E. (Edit), WIT Press / Computational Mechanics, WIT Press Sales Ashurst Lodge, Southampton, SO40 7AA, UK.
2. CHIRAS, Daniel D. and Reganold, John P. (2009) Natural Resource Conservation: Management for a Sustainable Future. Addison Wesley, 10 Edition, Boston, USA.
3. HAQUE, C. Emdad (Edit) (2010) Mitigation of Natural Hazards and Disasters: International Perspectives. Springer, Berlin, Germany.
4. TIETENBERG, Tom and Lewis, Lynne (2008) Environmental & Natural Resource Economics. Addison Wesley 8 Edition, Boston, USA.

## **Elective (Semester 07)**

**DM 675e**

**Global Regime in Disaster Management**

**Cr. H. 3**

### **Course Objectives:**

- i. To understand the disaster management framework and legislations in the context of global conventions.

### **Course Contents:**

- Introduction to Global Regime in Disaster Management
- Global challenges and disasters

- The linkage between Disasters and Millennium Developmental Goals (MDGs)
- Approaches and Paradigm Shift at Global Level
- International Decade for Natural Disaster Reduction (IDNDR) 1990-1999
- Yokohama Strategy and Plan of Action – Mid-review IDNDR
- International Strategy for Disaster Reduction (ISDR)
  - Public commitment and linkage to sustainable development, enlarged networking and partnerships. Mechanisms: IATF/DR, ISDR secretariat, UN Trust Fund
- Johannesburg Plan of Implementation 2002
- Hyogo Framework for Action 2005-2015
- Kyoto Protocol 2008-2012
- Disaster Risk Reduction tools for Climate Change Adaptation
- UNISDR DRR Strategy
- UN Su-Organizations and DRR
- Pakistan and DRR

### **Recommended Books:**

1. INTER-AGENCY Secretariat of the ISDR (2007) Hyogo Framework for Action 2005-2015: Building the resilience of nations and communities to disasters. Geneva: UN, ISDR
2. KHAN, A. N. (2009) Integrating Disaster Management and Climate Change Adaptation into Policy Making. Proceedings of the International Disaster Management Conference -2009, Baragali – Summer Campus, University of Peshawar, Khyber Pakhtunkhwa, Pakistan.
3. SINHA, P. C. (2006) Disaster management process: Law, policy and strategy. New Delhi: SBS Publishers & Distributors Pvt. Ltd.
4. STOKEY, E., & Zeckhauser, R. (1978) A primer for policy analysis. New York: W.W. Norton.

### **Elective (Semester 08)**

**DM 684a**

**Disaster Management Policies**

**Cr. H. 3**

### **Course Objectives:**

- i. To enhance the policy analysis skills of the students.
- ii. To understand the disaster management framework and legislations in Pakistan in the context of global conventions.

### **Course Contents:**

- National Disaster Management System at Pakistan
  - Definition, Need, Objectives, Principles, Composition, Major functions

- Disaster Management Bodies at Regional, National and International level
- Guiding principles for policy
- Process of policy formulation, implementation and techniques in policy analysis
- Organizations with overall Disaster Management Responsibilities in Pakistan's public sector
- Disaster Management and National Plans
- Legislation for Disaster Management
  - Civil Defence Act, 1952
  - The National Calamities Act (West Pakistan Calamities Act), 1958
  - Local Government Act, 2001
  - Emergency Services Ordinance/Act, 2002
  - Environment Legislation
  - National Disaster Management Act – 2010
  - ERR Act 2011
- National Disaster Management Policy, 2013
- Analytical review of the international policies and frameworks
  - Yokohama Strategy
  - The Geneva Mandate
  - Kyoto Protocol
  - Hyogo Framework for Action (HFA)

### **Recommended Books:**

1. INTER-AGENCY Secretariat of the ISDR (2007) Hyogo Framework for Action 2005-2015: Building the resilience of nations and communities to disasters. Geneva: UN, ISDR
2. KHAN, A. N. (2009) Integrating Disaster Management and Climate Change Adaptation into Policy Making. Proceedings of the International Disaster Management Conference -2009, Baragali – Summer Campus, University of Peshawar, Khyber Pakhtunkhwa, Pakistan.
3. SINHA, P. C. (2006) Disaster management process: Law, policy and strategy. New Delhi: SBS Publishers & Distributors Pvt. Ltd.
4. STOKEY, E., & Zeckhauser, R. (1978) A primer for policy analysis. New York: W.W. Norton.
5. GOVERNMENT of Pakistan (GOP) (2002) National Resettlement Policy Draft. Ministry of Environment, Local Government & Rural Development, Pakistan Environmental Protection Agency, [Online], Accessed 2008, [http://www.pakistan.gov.pk/redirect.jsp?action=book\\_mark&goto=174](http://www.pakistan.gov.pk/redirect.jsp?action=book_mark&goto=174)
6. GOVERNMENT of Pakistan (GOP) (2010) NDM Act 2010. National Disaster Management Authority, NDMA, Prime Minister's

Secretariat, Constitution Avenue, Islamabad-Pakistan,  
www.ndma.gov.pk

7. GOVERNMENT of Pakistan (GOP) (2011) Earthquake Rehabilitation and Reconstruction Act 2011. Earthquake Rehabilitation and Reconstruction Authority, ERRA, Prime Minister's Secretariat, Constitution Avenue, Islamabad-Pakistan, www.ndma.gov.pk

### **Elective (Semester 08)**

**DM 684b**

**Good Governance in Disaster Management**

**Cr. H. 3**

#### **Objectives:**

By the end of this course students shall be capable of understanding the significance of good governance in disaster management and its influence on good practices in disaster management.

#### **Course Contents:**

- Introduction to the Good Governance in Disaster Management
- Governance and its types
- Governance indicators (worldwide and Pakistan)
- DRR, Good Governance and Development
- Positioning disaster risk reduction in government
- Good governance for disaster management
- The role of the good governance in disaster management
- Good governance through development assistance
- Case studies of good governance in disaster management activities
- Learning Experiences: Governance issues in disaster management
  - Ownership of initiatives
  - Participation
  - Communication
  - Strengthening implementing capacity
  - Accountability
- Institutional and Policy Analysis for DRR in Pakistan
- Institutional Aid and Good Governance

#### **Recommended Books:**

1. AGERE, S. (2000) Promoting Good Governance: Principles, Practices and Perspectives. Commonwealth Secretariat: London
2. COLLINS, A. E. (2009) Disaster and development. Routledge: Oxon
3. DARA. (2009) Humanitarian Responsibility Index 2008: Donor Accountability in Humanitarian Action. Palgrave Macmillan: Madrid
4. VAYUNANDAN, E. and Mathew, D. ed. (2003) Good Governance: Initiatives in India. Prentice Hall of India: New Delhi

**Course Objective:**

The basic aim of this course is to expose students to key concepts of disability, how disaster affect the disable people and how to protect disable persons in disaster situation.

**Course Contents:**

- Introduction to the term disability
- Causes of Disability
- Disabled status in the world
- International conventions on disability
- National Policies on Disability in Pakistan
- Disaster and Disability Nexus
- Problems and Coping Mechanism during disaster
- Guidelines to include disability in disaster preparedness and management
- Protection of Life & Security during Disasters
- Assessment procedures in Intervention
- Role of CBOs in Rehabilitation of Disabled
- Physical, Sociological and Medical approaches for rehabilitation of Disable after disaster
- Livelihood Options for the Persons with Disabilities after disaster
- Best Practices

**Recommended Books:**

1. ABU-HABIB , Lina (1997) Gender and Disability, Women's Experiences in the Middle East, Oxford: Oxfam (UK and Ireland)
2. CHRISTENSEN, K.M., Blair, M. E. and Holt, J.M. (2007) The Built Environment, Evacuations, and Individuals With Disabilities: A Guiding Framework for Disaster Policy and Preparation. In Journal of Disability Policy Studies Spring 2007 vol. 17 no. 4 249-254
3. MORTON, David (2010) Social Security and Disability, Dalta Printing Solutions, Inc. California.
4. DFID (2000) Disability, Poverty and Development, DFID issues paper, Department For International Development, London:
5. HANDICAP International (2004) How to Include Disability issues in Disaster Management. Handicap International, Dhaka.
6. SINGH, P. (2007) Impact of South Asian Earthquake on Disabled People in the State of Jammu and Kashmir. <http://wecando.wordpress.com/2007/10/27/paper-impact-of-south-asian-earthquake-on-disabled-people>.



## Elective (Semester 08)

DM 684d

### Health, Hygiene and Sanitation in Disaster Management

Cr. H. 3

#### Course Objectives:

- i. To explore the relationship of DM and Health.
- ii. To understand the consequences of disasters and Health response.
- iii. To know strategies for Health response in DM.

#### Course Contents:

- Introduction to Health Issues in Disaster Management
- Basic Elements of Public Health
- The Consequences of Disasters and Its Impacts on Public Health
- Public Health and Phases of Disaster Response
  - Acute Phase (Surgical, Rapid response, Ambulances etc.)
  - Non-Surgical
  - Chronic Phase
- Short Term Programmes
  - Mobile Clinic, Tele Health, Training, Restoration of Public Health Facilities, Safe Community, Rehabilitation Medicines, Drugs and Vaccines, Liaison with other Stakeholders of DM etc.
- Long Term Programmes
  - Medical Support
  - Rapid Response Unit
  - Field Hospital and Mobile Clinic
- Management of Health Issues in Disasters (Coordination, Logistics, Manpower etc.)

#### Recommended Books:

1. DRECHSEL, Pay et al. (2009) Wastewater Irrigation and Health: Assessing and Mitigating Risk in Low-income Countries. Earthscan, London, UK.
2. HUNTER, Nan D. (2009) The Law of Emergencies: Public Health and Disaster Management. Elsevier Inc., New York, US.
3. NOVICK, Lloyd F.; Morrow, Cynthia B.; Mays, Glen P. (2008) Public Health Administration: Principles for Population-Based Management. Edition 2, Jones and Bartlett Publishers, Inc.
4. PRETTO, Ernesto A. (1995) A Brief Introduction to Disaster Medicine, Emergency Public Health. Published By University of Pittsburgh.

## Elective (Semester 08)

DM685a

### Psychological Impacts of Disasters

Cr. H. 3

#### Course Objectives:

- i. To understand the psychological impacts of disasters.

- ii. To know about psychological Trauma.

### **Course Contents:**

- Introduction to Psychological Impacts of Disasters
- Disaster Impacts
- Psychological Trauma
- Trauma response
  - Normal response, Basic principle, Bio psychosocial model, cultural influences
- Classification of Psychological Disorders
  - Depression, Anxiety, Post- traumatic stress disorder
- Children in Disasters
  - Development tasks, risk factors, and childhood traumatic grief
- Psychological and social support
  - Psychological first aid, coping strategies, and resiliency models

### **Recommended Books:**

1. ALLEN, J.G (1995) Coping with trauma: A Guide to self-understanding. Washington D.C: American psychiatric press.
2. MYERS, David G. (2009) Psychology. Worth Publishers, Ninth Edition, London, UK.
3. OLLENDICK, T.H., & Cerry, J. (1981) Clinical Behaviour therapy with children. New York: plenum press.
4. WORDEN, J. W. (1991) Grief counseling and Grief therapy: A Handbook For The Mental Health Professional, New York, Springer Publishing Co.
5. ZADOR, Noka (2004) Treating Psychological Trauma and PTSD. Wilson, John P.; Friedman, Matthew, J.; and Lindy, Jacob D. (Edit), The Guilford Press, 1 Edition, New York, USA.

### **Elective (Semester 08)**

**DPM 685b**

**Flood Hazard Risk Reduction**

**Cr. H. 3**

### **Course Objectives:**

To understand the nature, causes, consequences and remedies of the flood hazard.

### **Course Contents:**

- Introduction to Flood Hazard
- General Characteristics of Flood
- Causes of Floods
  - Meteorological
  - Hydrological
  - Anthropogenic
- Flood Intensifying Conditions

- Types of Floods (Riverine flood , Flash flood, Coastal flood, GLOF)
- Impacts of flood
- Basic Principles in Flood Hazard Assessment
- Integrated Flood Risk Management
- Flood Mitigation Measures
  - Structural (Engineering Protection)
  - Non-structural (Planning and Policies)
- Early Warning System for Floods

### **Recommended Books:**

1. HEWITT, K. (1997) Regions of Risk: A Geographical introduction to disaster, Harlow, Longman.
2. KUMAR, N (2006) Disaster Management Progressive international Agencies (PVT) Limited, New Delhi, India.
3. MARTINI (2002) Flood & Mega flood Process and Deposit: Recent & Ancient Examples Multi-Lines Books Lahore. Pakistan
4. ROSENFELD, C. (1994) Flood Hazards Reduction: GIS maps, survival strategies in Bangladesh. Geo Info Systems, Dacca.
5. SMITH, K. (1992) Environmental Hazards: Assessing and reducing disasters. Routledge, London, UK.
6. WISNER, Piers Blaike (2004) At Risk- Natural Hazards, Peoples, Vulnerability and Disaster, Ben Vanguard Books (PVT) Limited Lahore.

### **Elective (Semester 08)**

**DPM 685c**

## **Basic Engineering Practices in Disaster Management**

**Cr. H. 3**

### **Course Objectives:**

- i. To understand the role of various basic disciplines of engineering
- ii. Role of various engineering codes, guidelines and specifications
- iii. History of disasters with specific emphasis to Pakistan in context of engineering

### **Course Contents:**

- Introduction to basic engineering fields and their role (Agricultural, Chemical, Civil, Electrical, Mechanical and Mining)
- Typical process of engineering project output (concept, feasibility, design, approval, execution, handover, management, maintenance, end of design life disposal)
- Basic concept of Planning Commissioning proformas (PC-I to PC-V)
- Introduction of concept of codes, guidelines, specifications in various engineering fields with few case studies (Building Code of Pakistan – Seismic Provisions; Pakistan Electric Safety Code; other international examples)

- History of various disasters in world with summary of engineering challenges
- History of various disasters in Pakistan with engineering challenges

### **Recommended Books:**

1. PAKISTAN Engineering Council. Building Code of Pakistan – Seismic Provision 2007
2. PAKISTAN Engineering Council. Pakistan Electric Safety Code 2014 (in process of finalization)
3. JAMES, R., Chiles, (2002). Inviting Disaster: Lessons from the Edge of Technology, Harper Business, New York.
4. HENRY Petroski (1992). To Engineer Is Human: The Role of Failure in Successful Design, Vintage Books, New York.
5. DAVID D. A. Piesold (1991). Civil Engineering Practice: Engineering Success by Analysis of Failure, McGraw-Hill Companies
6. U.S. Army Corps of Engineers, Urban Search and Rescue Program, Shoring Operation Guide, 3<sup>rd</sup> edition, June 2013

### **Elective (Semester 08)**

**DM 685d**

**Role of Media in Disaster Management**

**Cr. H. 3**

### **Course Objectives:**

- i. To understand the role of various stakeholders of media in disaster management.
- ii. To study the impacts of media in disaster management.

### **Course Contents:**

- Disasters and the media in a global age
- The geopolitics of disaster coverage
- Making disasters mean and politically matter
- The making of a newsroom and news editing
- Disaster citizenship and assumption of state responsibility
- Accountability of disaster news: ethics of disaster reporting
- Social media and disaster
- Essentials of successful disaster communication
- Learning the application of communication principles in different phases of disasters
- Understanding disaster communications audience
- Managing media relations as a disaster manager
- Building an effective plan, strategy and skill for disaster communication in a changing media world
- Terrorism communication challenges

### **Recommended Books:**

1. Disasters and the Media by Mervi Pantti, Karin Wahl-Jorgensen and Simon Cottle (2012), Peter Lang, New York

2. Disaster Communications in a Changing Media World, Second Edition by George Haddow, Kim S Haddow (2014), Elsevier, New York
3. Reporting Disasters: Famine, Aid, Politics and the Media by Suzanne Franks (Mar 1, 2014), Hurst, London

## **Elective (Semester 08)**

**DPM 685e**

### **Contingency Planning in Disaster Management**

**Cr. H. 3**

#### **Course Objectives:**

- i. To understand the role of various basic disciplines of engineering
- ii. Role of various engineering codes, guidelines and specifications
- iii. History of disasters with specific emphasis to Pakistan in context of engineering

#### **Course Contents:**

- Introduction to contingency Planning
- Preparedness: Organization. Training, Planning and/or Plans
- Planning Process
- Plan Preparation: Level, Components, Viability, Check list etc.
- Dynamic Nature of Disaster Management
- Contingency Planning - Planning Continuum
- Methodology & Steps
- Content of the contingency Plan
- Time Line
- Likely Actions at Federal, Provincial and District levels
- Monsoon Contingency Plan

#### **Recommended Books:**

1. BIRKMANN, J. (2006) Measuring Vulnerability to Natural Hazards: Towards Disaster Resilient Societies. Tokyo, United Nations University Press.
2. DAMON, P. C. (2006) International Disaster Management. Butterworth-Heinemann.
3. DAMON, P. C. (2006) Introduction to International Disaster Management. Butterworth-Heinemann, UK.
4. DILLEY, Max (2005) Natural Disaster Hotspots: A Global Risk Analysis. World Bank and University of Columbia, US.
5. ELLIOT, J.E. (2006) An Introduction to Sustainable Development. Third Edition. Routledge, London UK.
6. HEWITT, K. (1997) Regions of Risk: A Geographical Introduction to Disaster. Harlow, Longman, New York, US.
7. SMITH, Keith and Petley, David N. (2009) Environmental Hazards: Assessing Risk and Reducing Disaster, Routledge, London, UK.

## **PART- II: Scheme of Study for MS programme in Disaster Management**

### **ELIGIBILITY:**

1. Preference will be given to BS 4 years / MSc. (16 years of education) Disaster Management degree (HEC recognized institutes/universities) for admission in 2 years MS Disaster Management programme.
2. Those candidate having BS 4 years / MSc. in any of the subject of Earth Sciences, Environmental Sciences, Space Sciences, Biological Sciences, Management Sciences, Agriculture Sciences, Medical Sciences, Economics, Sociology, Social Work, Psychology, Anthropology, Forestry, Architecture, Gender Studies, Journalism and Mass Communication, Civil / Earthquake / Agriculture / Mining Engineering, City / Urban & Regional Planning, Public Sciences, and Public Policies shall have to enrol in prerequisite and/or deficiency courses as proposed by the individual Department/university and as per HEC prescribed guidelines.

### **DURATION AND COURSE STRUCTURE:**

2 years spread over 4 semesters (two semesters per year)

### **DEGREE REQUIREMENT:**

30 credit hours including thesis

<b>Course Structure</b>	<b>Number of courses</b>	<b>Credit Hours</b>
Deficiency courses (Fundamental Courses, 0 Semester)	As required*	4-8
Core courses (First semester)	4	12
Elective/specialized (Second semester)	4	12
Thesis (Third & Fourth semesters)	2 (thesis)	06 (thesis)
<b>Total</b>	<b>10</b>	<b>30</b>

\* Mandatory for non-disaster managers. However, postgraduate diploma holder in disaster management (HEC Recognized) will be exempted.

### **EVALUATION:**

For the uniformity in the evaluation system, NCRC recommends that the minimum CGPA required to pass a semester is 2.5 out of 4.0 at graduate level or decided by the respective bodies of the university as per rules in vogue.

## LAYOUT OF COURSES FOR MS

Four core courses and four elective courses, each with 3 credit hours to be selected in first and second semester. Number of options that shall be offered during the course of study shall depend upon the availability of faculty and lab facilities. More groups can also be added depending on the availability of resources. More special topics could also be added to these by the board of studies of the individual departments. The respective board of studies of the departments, keeping in view the availability of staff and resources, may prepare detail outline of the course and approve it accordingly (for some of the course outline is prepared and given).

### CORE COURSES (FIRST SEMESTER)

S. No.	Course Titles	Cr.hr
1.	Introduction to Disaster Management	3
2.	Disaster Risk Assessment	3
3.	Disaster Planning and Management	3
4.	Emergency Response Management	3
5.	Disaster Risk and Development	3
6.	Natural Hazards of Pakistan	3
7.	Community Based Disaster Risk Management	3
8.	Research Methodology in Disaster Management	3
9.	Disaster Response and Recovery	3
10.	Disaster Risk Reduction and Preparedness	3
11.	Fundamentals of GIS and RS in Disaster Management	2+1
12.	Statistical Techniques in Disaster Management	2+1

### ELECTIVE COURSES (SECOND SEMESTER)

S. No.	Course Titles	Cr.hr
1	Application of Geo-informatics in Disaster Management	2+1
2	Climate Change and Disasters	3
3	Climate Change Adaptation and Disaster Mitigation	3
4	Management of Desertification Hazard	3
5	Disaster Management and Economy of Pakistan	3
6	Disaster Management Policies	3
7	Disaster Risk and Vulnerabilities Assessment	3
8	Disaster Risk Financing	3

9	Disasters Risk and Urbanization	3
10	Management of Drought Hazard	3
11	Management of Earthquake Hazard	3
12	Economics of Disasters	3
13	EIA and Risk Assessment	3
14	Management of Flood Hazard	3
15	Forecasting of the Hydro-Meteorological Hazards	3
16	Gender Mainstreaming in Disaster Management	3
17	Geomorphology and Natural Hazards	3
18	Hazards Mapping	2+1
19	Impacts of Climate Change and Disasters in Pakistan	3
20	Management of Landslide Hazard	3
21	Livelihoods and Disasters	3
22	Disaster Planning and Management in Pakistan	3
23	Psychological Impacts of Disasters and its Management	3
24	Sociology of Disasters	3
25	Media and Disasters	3
26	Contingency Planning	3

### **THESIS (THIRD & FOURTH SEMESTERS)**

MS. Thesis will be equal to six (06) credit hours which will be consisting of 15,000 plus words in semester 3 and 4. In addition, the research scholar will be required to publish a research article in HEC recognized Journals of any category.

### **DETAIL OF CORE COURSES (FIRST SEMESTER)**

**DM 01**                      **Introduction to Disaster Management**                      **Cr. H. 3**

#### **Course Objectives:**

- i. To understand the basic concepts in Disaster Management.
- ii. To know the interrelation between Man and Disasters.
- iii. To understand the complicated and compound nature of all disasters.
- iv. To enable the students to phase out disasters consequences and their management.

#### **Course Contents:**

- Introduction to Disaster Management
- Definitions
- Environmental Processes
- Extreme Natural Events
- Man and Environment Relationship
- Hazards and Resources



- Types of Natural Hazards
- Man-made Hazards
- Disasters
- Types of Disasters
- Causes, Consequences and Impacts of Disasters
- Disaster Management Cycle
- Vulnerability and its types
- Capacity and its types
- Risk

### **Recommended Books:**

1. BIRKMANN, J. (2006) Measuring Vulnerability to Natural Hazards: Towards Disaster Resilient Societies. Tokyo, United Nations University Press.
2. COLLINS, A.E. (2009) Disaster and Development, Routledge, London, UK.
3. DAMON, P. C. (2006) Introduction to International Disaster Management. Butterworth-Heinemann.
4. ELLIOT, J.E. (2006) An Introduction to Sustainable Development. Third Edition. Routledge, London UK.
5. HEWITT, K. (1997) Regions of Risk: A Geographical Introduction to Disaster. Harlow, Longman, New York, US.
6. SMITH, Keith and Petley, David N. (2009) Environmental Hazards: Assessing Risk and Reducing DisasterRourledge ., London, UK.

**DM 02**

**Disasters Risk Assessment**

**Cr. H. 3**

### **Course Objectives:**

- i. To understand the concept of Risk in DM.
- ii. To know the basic elements of Risk Assessment.
- iii. To develop skills for decision making in Disasters Risk assessment.

### **Course Contents:**

- Basic Concepts (Geomorphic Process, Natural Hazard, Disaster, Vulnerability, Capacity and Risk)
- Hazard Assessment
  - Type, Nature of Occurrence, Location, Density, Intensity, Frequency
  - Data Availably and Quantifying the Hazards
- Vulnerability and/or Exposure Assessment
  - Elements at Risk and Quantifying the Elements at Risk
  - Acceptance Level and Limitations
- Capacity Assessment
  - Classification, Level and Dimension of Capacities
  - Quantifying the Capacities

- Risk Assessment
  - Characteristics of Risk, Dynamic Pressure, Underlying Causes, the Progression of Vulnerability, and Disaster Crunch Model.
  - Matrix of Risk, Risk Record and the Probability of Risk
- Decision Making
  - Limitations of Risk Assessment, Cost-Benefit Analysis, Acceptance Level of Risks, Risk Management and National Development, Best Option Considerations

### **Recommended Books:**

1. CROUHY, Michel; Galai, Dan; Mark, Robert; (2005) The Essentials of Risk Management. The McGraw Hill Co., New York, US.
2. DAMON, P. C. (2006) Introduction to International Disaster Management. Butterworth-Heinemann, UK.
3. DILLEY, Maxx (2005) Natural Disaster Hotspots: A Global Risk Analysis. World Bank and University of Columbia, US.
4. ELLIOT, J.E. (2006) An Introduction to Sustainable Development. Third Edition. Routledge, London, UK.
5. HEWITT, K. (1997) Regions of Risk: A Geographical Introduction to Disaster. Harlow and Longman, Edinburgh, UK.
6. SMITH, Keith; Petley, David N. (2009) Environmental Hazards: Assessing Risk and Reducing Disaster Rout .ledge, London, UK.

**DM 03**

**Disaster Planning and Management**

**Cr. H. 3**

### **Course Objectives:**

- i. To know the multidisciplinary and multispectral approach in DM.
- ii. To know the basic elements of planning and plan preparation in DM.
- iii. To understand the role of all stakeholders in DM.

### **Course Contents:**

- Introduction to Disaster Planning and Management
- Planning Process
- Disaster Management
- Significance of Disaster Planning and Management
- Disaster Management Cycle
- Stages in Disaster Management
- Modern Challenges in Disaster Management
- National Disaster Risk reduction Policy
- Main Elements of National Policy
- Disaster Management Plan
- Major Requirements for Coping with Disasters
- The Basic Philosophy for Coping with Disasters
- Key Players in Disaster Management
- International Disaster Assistance

- Role of Government, Communities, Media, NGOs and Policies
- Institutional and Legislative Aspects
- Mainstreaming Hazards Mitigation into Sustainable Development

### **Recommended Books:**

1. BURTON, I.; Kates, R.W.; White, G.F. (1993) The Environment as Hazard, The Guildford Press, London, UK.
2. CROUHY, Michel; Galai, Dan and Mark, Robert (2005) The Essentials of Risk Management. The McGraw Hill Co., New York, US.
3. DAMON, P. C. (2006) Introduction to International Disaster Management. Butterworth-Heinemann, UK.
4. DILLEY, Maxx (2005) Natural Disaster Hotspots: A Global Risk Analysis. World Bank and University of Columbia, US.
5. LEWIS, J. (1999) Development in Disaster-Prone Places, IT Press, London, UK.
6. SMITH, Keith; Petley, David N. (2009) Environmental Hazards: Assessing Risk and Reducing Disaster .Routledge, London, UK.

**DM 04**

**Emergency Response Management**

**Cr. H. 3**

### **Course Objectives:**

- i. To link Emergency Management with DM.
- ii. To understand the Response Mechanism for an Emergency situation.
- iii. To develop skills for Emergency Response Management.

### **Course Contents:**

- Disasters and Emergency Situation
- The nature of Emergency Situation
- Disaster Management and Emergency Management
- Phases of Emergency Management (Response, Recovery, Mitigation and Preparedness)
- Emergency Situation Analysis
- Emergency Response Organizations (Federal, Provisional, District, Community, Individual, NGOs)
- Emergency Operation Centre
  - Major Components of EOC
  - Organogram
  - Special Powers (Legislation)
  - Operational Plans
  - Logistics
  - Communications
- Key Stakeholders (Security Agencies, Emergency Response Units, Medical Care Units, Relief and Rehabilitation Organizations, Volunteers etc.)

- Emergency Mitigation (Risk Assessment, Precautionary Measures, Minimizing the Risk)
- Preparedness for Response (Training, Planning, Plan, and Institutions)

### **Recommended Books:**

1. ALEXANDER, David (2002) Principles of Emergency planning and Management. Terra Publishing, University of Minnesota, US.
2. BUCHANAN, Sally (2000) Emergency Preparedness. Preservation Issues and Planning. Chicago, American Library Association
3. GOODMAN, Louis J. and Love Ralph N. (2003) Project Planning and Management: an Integrated Approach. East-West, Mountain View, CA.
4. VAN Der Weide, A. (2003) Project Planning and Management, LEMMA, ISBN 90-5931-1523
5. WISNER, Ben; Blaikie, P.; Cannon, T. and Davis, I. (2004) At Risk - Natural Hazards, People's Vulnerability and Disasters. Routledge, London, UK.

**DM 05**

**Disaster and Development**

**Cr. H. 3**

### **Course Objectives:**

- i. To make understand the students about the interdependence of development measures and the natural hazards and disasters.
- ii. The aims at the exploration of necessity of the integration of disaster risk reduction into the development projects.

### **Course Contents:**

- Forging the links between disasters and development
- NDMA Act 2010
- The dilemma of sustainability
- The Concept & Historical Perspective of Sustainable Development
- Medium Term Development Framework
- The Conceptual Relationship between Disasters and Development
- Disasters – A challenge for developing countries and development cooperation
- Global Risk Factors
- The Disaster Risk Index
- Risk Patterns at the National and Local Level
- The Millennium Development Goals
- Disaster Risk Reduction; An Instrument for Achieving Millennium Development Goals
- Disaster and National Development
- Assessing the trade-offs in investing in vulnerability reduction
- National Developmental Plans/ Legislation of Pakistan
- Case studies

### **Recommended Books:**

1. CARREÑO, M., Cardona, O., & Barbat, A. (2007) A disaster risk management performance index. *Natural Hazards*. 41 (1), 1-20.
2. DURYOG Nivaran (Organization). (2008) South Asia disaster report, 2008: Disaster and development in South Asia: connects and disconnects. Colombo: Duryog Nivaran Secretariat.
3. MIDDLETON, N. (1998) Disaster and development: The politics of humanitarian aid. London: Pluto Press.
4. PELLING, M. (2003) Natural Disaster and Development in a Globalizing World. London: Routledge.
5. UNDP. (2004) Reducing disaster risk: A challenge for development: A global report. New York: UNDP.

**DM 06**

**Natural Hazards of Pakistan**

**Cr. H. 3**

### **Course Objectives:**

- i. To familiarize with physiographic personality of Pakistan.
- ii. To understand the nature, causes, consequences and remedies of the natural hazards occurring in Pakistan.

### **Course Contents:**

- Introduction to Natural Hazards and Disasters
- Physiography of Pakistan
- Climate of Pakistan
- Ecological Regions of Pakistan
- Seismic Hazards Zone of Pakistan
- Major Natural Hazards of Pakistan
  - Floods
  - Earthquakes
  - Tsunami
  - Landslides
  - Desertification
  - Drought
  - Cyclone
  - Snow Avalanches
  - Glacial Hazards
  - Salinization
  - Heat and Cold Waves
  - Sea Water Intrusion
- Future Disaster Trends in Pakistan
- Disasters Management Policies in Pakistan
- Case studies

### **Recommended Books:**

1. AHMAD, N. and Qureshi, I. A. (1995) Disaster Management in Punjab: A

- study of flood management in district Jhelum. Pakistan Academy for Rural Development, Peshawar.
2. BIRKMANN, J. (2006) Measuring Vulnerability to Natural Hazards: Towards disaster resilient societies. Tokyo, United Nations University Press.
  3. FOSTER, H. D. (1980) Disaster Planning: The preservation of life and property. Berlin, Springer Verlag.
  4. HEWITT K. (1997) Regions of Risk: A Geographical introduction to disaster, Harlow, Longman.
  5. KHAN, A.N. (1996) Planning for Reduction of Flood Hazard. Proceeding of Pakistan Geographical Association, Bahawalpur Conference.
  6. McENTIRE, D. (2007) Disaster Response and Recovery: New Jersey, Oxford, UK.

**DM 07**

## **Community Based Disaster Risk Management**

**Cr. H. 3**

### **Course Objectives:**

The main purpose of this course is to make the students understand various participatory approaches and strategies and their application in Disaster Management.

### **Course Contents:**

- The concept of Group, Community and Society
- Social structure and social organization
- Perception and Attitude of Community towards Disasters
- Community Vulnerability
- Theories and Models of Participatory Development
- Participatory Tools and Techniques for Capacity, Vulnerability, Hazards and Risk Assessment
- Participatory Community Risk Assessment
- Participatory Disaster Risk Management Planning
- Community-Managed Implementation
- Participatory Monitoring and Evaluation
- Building Capacity and Resilience
- Disaster Risk Communication/ Awareness in DRR
- Mainstreaming of CBDRM in Public Policy, Planning and Implementation.
- Role of CBOs and NGOs

### **Recommended Books:**

1. CHAMBERS, R. (1997) Who's Reality Counts: Putting the Last First. Intermediate Technology Publications, London.
2. DERCOLE, Robert & Pigeon, P.M. (1998) Natural disasters in South East Asia and Bangladesh - Vulnerability Risks and Consequences. CRED, Brussels.

3. GUIJT, Irene and Kaul, Shah M. (1999) The myth of Community: Gender Issues in Participatory Development. Intermediate Technology Publication, London.
4. MOSSE, D, and Farrington, J. (1997) Development as Process: Concepts and Methods for Working with Complexity. Routledge, London and New York.
5. SASTRY, K. R. (2001) Improving Community Participation and People's Awareness in Disaster Reduction in Learning from Natural and Technological Disasters: Global Blueprints for Change. Institute of A. D. Hyderabad, India.
6. SAY, R. Y. (2002) Participatory Project Cycle Management (PPCM): A Planning Method for Community Development. Asian Productivity Organization (APO).

**DM 08**

## **Research Methodology in Disaster Management**

**Cr. H. 3**

### **Course Objectives:**

- i. To understand research particularly in the field of Disaster Management.
- ii. To know the methods of data collection, analysis and interpretation.
- iii. To develop research design for different case studies.

### **Course Contents:**

- Introduction
- Types of Research
- The Nature of Research Approaches
  - Ethnographic, Survey and Experimental Style
- Basic Elements of Scientific Research Methodology
- Research in the Field of Disaster Management
- Research Process
- Methods/Techniques of Data Collection and Analysis
- Questionnaire Design, Field Survey, Analysis, Interpretation
- Data Classification and Tabulation
- Sample and Sampling
- Theory and Hypothesis
- Writing a Research Proposal

### **Recommended Books:**

1. CRESWELL, John W. (2009) Research Design: Qualitative, Quantitative, and Mixed Methods Approaches. Sage Publications
2. HOWARD, K. ef; Sharp, J.A. (1983) The Management of a Student Research Project. Gower Publishing Company, UK.
3. JOHN, W. Creswell (2009) Research Design: Qualitative, Quantitative, and Mixed Methods Approaches.

4. MYERS, Jerome L. Well, Arnold D. (2002) Research Design & Statistical Analysis. 2nd Edition, Routledge, London, UK.
5. TUCKER, Lyne, et.al. (1990) Research Methods and Statistical Analysis, IPS; Nottingham University U.K.

**DM 09**

## **Disaster Response and Recovery**

**Cr. H. 3**

### **Course Objectives:**

Aims to introduce the students to different themes related to Disaster Response and Recovery. The course also aims to provide fundamental knowledge of Project Cycle Management and to introduce students the wide range of key tools that support effective project cycle management.

### **Course Contents:**

- Overview of Response to Disasters
  - Planning for response to natural disasters
  - Planning for response to man-made disasters
- Managing Disasters and Emergences
  - Management, Organization and Coordination
  - Needs assessment and immediate response, supplies and logistics
  - Activating Emergency Notification and Disaster Response Systems
  - Resource Mobilization and Allocation
  - Communication between Agencies
  - Sector Components
  - Crisis and conflict management
- Disaster Reporting
  - Understanding Disaster Reporting
  - Phases of Disaster Reporting (pre, during, post)
  - Risk Management Regime and Sources of Information
  - Current Trends in Reporting Disasters
  - Role of Local Media (Role & Obligations)
  - Disasters on the News Desks
  - Conflict Sensitive Reporting
  - Developing a Code of Conduct for reporting disasters
- Planning for Recovery and Resettlement
- Disaster planning and recovery issues
- Relief and Residual Relief
- Response and recovery programs (settlement, infrastructure, services and livelihood, etc)
- Institutional framework and networking
- Reconstruction
- Overview of the Project Cycle



- Disaster Recovery: Issues and Remedies
- Entitlement, equity and governance

### **Recommended Books:**

1. ASIAN Disaster Reduction Center, Kobe, Japan, Total Disaster Risk Management (Good Practices), 2005.
2. ECONOMIC Commission for Latin America and the Caribbean (ECLAC), 2003.
3. OXFAM. (1995). The Oxfam Handbook of Development and Relief, Oxfam, Oxford.
4. HANLEY, N., Spash, C. L. (1993). Cost-benefit analysis and the environment. Edward Elgar Publishing Ltd, Cheltenham
5. SAVE the Children (1996). Toolkits: A Practical Guide to Assessment, Monitoring, Review and Evaluation, Save the Children, London.
6. CERNEA M. M. (Ed) (1991). Putting People First, Sociological variables in rural development, Second Edition, A World Bank Publication, Oxford: Oxford University Press
7. ROBINSON, D. Hewitt, T. and Harris, J. (2000). Managing Development: understanding inter-organizational relationships, Sage Publications, London
8. WIELD D. (1999). Tools for project development within a public action framework, Development in Practice, Volume 9, Numbers 1 & 2. Sage Publications, London
9. WARREN, D.M. et al. (1995). The Cultural Dimensions of Development, Intermediate Technology Publications, London.

**DM 10**

**Disaster Risk Reduction and Preparedness**

**Cr. H. 3**

### **Course Objectives:**

Aims to give students understanding of concepts and methodologies for disaster preparedness and response and making them capable to suggest workable plans for field case histories.

### **Course Contents:**

- Conceptual and Methodological Issues
  - Types of Disasters
  - Disaster management stages
  - Time Scale (pre, during and post disaster scenario)
  - Disaster Classification
  - Vulnerabilities, Impact and scale of damage
  - Coping Capacities Mechanism
  - Classification of damages and effects
  - Social, infrastructure, economic, environmental and overall effects of damages
- Databases and Disaster Information

- Types and sources of disaster related information
- Development of appropriate databases from community level to the national level
- Database coordination, sharing and communication over time and space
- Disaster Preparedness
  - Situation Analysis (Risks, vulnerabilities & capacities)
  - Response Mechanism (existing and required)
  - Preventive measures / methodologies
  - Preparedness Planning (Need for preparedness planning, Planning processes and elements)
  - Mitigation Measures
  - Coordination
  - Resource Mobilization
  - Information Management
  - Early Warning System (existing and required)
  - Public Education, Training and Rehearsals
- Social and Economic Impact Assessment of Disasters
  - Impact assessment framework/process
  - Tools and techniques
- Contingency Planning and its Process
  - Hazard and risk analysis, contingency prioritization
  - Scenario building
  - Preparing a contingency plan for each selected scenario
  - Rescue, relief, and evacuation planning
  - Monitoring and updating the contingencies plan
- Integrating Disaster Preparedness with Development
  - Mainstreaming DRR into Development
  - Structural Measures (Disaster shelters, Emergency housing, evacuation shelters, Retrofitting, etc.)
  - Non-Structural Measures
  - Legislations and Reforms (Building Code etc.)
  - Institutional Strengthening
- Building Safer and Resilient Communities
  - Risks and Needs of the communities:
  - Prone to natural disasters
  - Post disaster communities

### **Recommended Books:**

1. ASIAN Disaster Reduction Center, Kobe, Japan, Total Disaster Risk Management (Good Practices), 2005.
2. Economic Commission for Latin America and the Caribbean (ECLAC), 2003.
3. HANDBOOK for Estimating the Socio-economic and Environmental Effects of Disasters, Vol. 1 to 4, 2003.

4. Joseph Gustin, Disaster & Recovery Planning: A guide for facility managers, 4th Edition, Fairmont Press, 2002.
5. DONNA R. Childs and Stefan Dietrich, Contingency planning and disaster recovery, John Wiley and Sons, Inc., 2002.
6. WFP, Contingency Planning (Guidelines). UNHCR, Handbook for emergencies, 1982.

**DM 11**

## **Fundamentals of GIS and RS in Disaster Management**

**Cr. H. 2+1**

### **Course Objectives:**

To provide with a background, principles and practices of GIS and RS in disasters risk management.

### **Course Contents:**

- Concept and principles of GIS and RS,
- Historical evolution of Remote Sensing technology,
- Passive and Active Remote Sensing,
- Electromagnetic spectrum, Interactions with the Atmosphere,
- Principle of Remote Sensing and Aerial photogrammetry,
- Methods of interpretation of aerial photographs,
- Identification of important features with special reference to hazards, vulnerability, risk mapping,
- Practical Exercises of photo interpretation,
- Data models in GIS,
- Global Positioning System (GPS),
  - Use and application of GPS in Disaster management,
- Different types of Resolution
  - Spectral
  - Radiometric
  - Temporal
  - Spatial
- Raster data interpretation,
- Digitization of data, management, handling, editing,
- Spatial analysis, output and organization,
- Hazards and disasters data collection for GIS database development.

### **Recommended Books:**

1. ABRAMS, J. and Hall, P. (2006) Mapping- New Cartographies of Networks and Territories. University of Minnesota Design Institute, Minnesota.
2. ARONOFF, S. (2005) Remote Sensing for GIS Managers: ESRI Press, New York.
3. CARLETON .A. (1990) Satellite Remote Sensing in Climatology: CBS Publishers and Distributor, New Delhi.
4. CARRARA and Guzitti (2001) Geographical Information System in Assessing Natural hazards: Dordrecht, Kluwer.

5. LILLESAND, T. M. (2006) Remote sensing and image interpretation: John Wiley & Sons, Inc. New York.
6. MASSER, I. and Blakemore, M. (1991) Handling Geographical Information: Methodology and Potential Applications. Longman. New York.

**DM 12**

## **Statistical Techniques in Disaster Management**

**Cr. H. 3**

### **Course Objectives:**

- i. To understand the nature of data in Disaster Management.
- ii. To use statistical techniques for data collection, analysis and interpretation.
- iii. To handle research data in digital format particularly the use of SPSS.

### **Course Contents:**

- Introduction to Statistical Techniques in Disaster Management
- Statistical Concepts
- Disaster Management and the Attribute Data
- Data Collection
- Summarizing Data
- Grouping Techniques
- Measures of Central Tendency
- Measures of Dispersion
- Comparisons
- Purely Descriptive Comparisons
- Hypothesis Testing
- Inferential Explanatory Comparisons
- Probability and Non-Probability
- Relationships
- Trends
- Computer Based Statistics (SPSS16/MS Excel etc.)
- GIS Techniques in Data Analysis and Presentation

### **Recommended Books:**

1. BIRKMANN, J. (2006) Measuring Vulnerability to Natural Hazards: Towards Disaster Resilient Societies. Tokyo, United Nations University Press.
2. MARSHALL, Catherine; Rossman, Gretchen B. (2006) Designing Qualitative Research. Edition 4, Sage Publications, Los Angeles, US.
3. MAXWELL, Joseph A. (2005) Qualitative Research Design: An Interactive Approach. Edition 2, Sage Publications, Los Angeles, US.
4. MYERS, Jerome L. and Well, Arnold D. (2002) Research Design & Statistical Analysis. 2<sup>nd</sup> Edition, Routledge, London, UK.
5. TOYNE, Petter & Peter T. Newby & Hammond R.(1971) Techniques in Human Geography, UK.

## DETAIL OF ELECTIVE COURSES (SECOND SEMESTER)

DM 01

### Application of Geo-informatics in Disaster Management

Cr. H. 3

#### Objectives:

This course would help the students to understand the uses and application of GIS & RS technology in the field of Disaster Management.

#### Course Contents:

- Course introduction,
- Characteristics of Satellite Images,
  - Interpretation of satellite images,
  - identification and demarcation of important features,
  - Mapping from Satellite Images,
- Application of GIS and RS in Disasters Forecasting and Management,
- Navigation System,
- Identification of hazard prone areas,
- Hazard mapping,
- Vulnerability mapping,
- Risk mapping,
- Lithosphere, Atmosphere, Ionization, Ionic Sphere, Coupling Model, and its application in earthquake precursors,
- Uses and applications of multi-spectral, spatial, temporal remote sensing in flood risk management,
- Landslide susceptibility mapping,
- seismic hazard mapping,
- Comparative GIS based disaster related Case Studies,
- Practical Exercises on creating various disasters maps using GIS software such as Arc GIS /ERDAS/MAP INFO/ILWIS.

#### Recommended Books

1. ABRAMS, J. and Hall, P. (2006) Mapping- New Cartographies of Networks and Territories. University of Minnesota Design Institute, Minnesota.
2. ARONOFF, S. (2005) Remote Sensing for GIS Managers: ESRI Press, New York.
3. CARLETON .A. (1990) Satellite Remote sensing in climatology: CBS publishers and distributor, New Delhi.
4. CARRARA and Guzitti (2001) Geographical Information System in Assessing Natural hazards: Dordrecht, Kluwer.
5. LILLESAND, HOMAS M. & R.W. KIEFER, (1994): Remote Sensing and Image Interpretation: John Wiley Sons, Inc. New York.
6. LILLESAND, T. M. (2006) Remote sensing and image interpretation: John Wiley & Sons, Inc. New York.

**Course Objectives:**

- i. To figure out the interactions in bio-sphere.
- ii. To understand the Man and environment interaction.
- iii. To interlink the disasters and climate change.
- iv. To understand the climate change at global, regional and local levels.

**Course Contents:**

- Introduction to Climate Change and Disasters
- Weather and Climate
- Elements of Weather and Climate
- Global Climatic Regions
- Role of Oceans
  - Surface current, El-Nino and La-lina Effect, Carbon sink
- Earth Heat Budget System
- Hydro-meteorological System
- Causes of Climate Change
  - Natural and Anthropogenic
- Climate Change
- Global Warming
- Extreme Weather Events
- Climate Change and Extreme Hydro-meteorological Events
- Hydro-meteorology Disasters
- Global Distribution of Hydro-meteorological Disasters
- Impacts of Climate Change
- Climate Change and Vulnerabilities
- Climate Change Mitigation
- Climate Change Adaptations

**Recommended Books:**

1. BURROUGHS, William James (2007) Climate Change: A Multidisciplinary Approach. 2nd Edition, Cambridge University Press, London, UK.
2. GAVIN, Schmidt and Wolfe, Joshua; Jeffrey, D. Sachs (2009) Climate Change: Picturing the Science, Earthscan, London, UK.
3. INTERGOVERNMENTAL Panel On Climate Change (IPCC) (2007), Climate Change 2007 - The Physical Science Basis Contribution of Working Group I to the Fourth Assessment Report of the IPCC.
4. KININMONTH, William (2004) Climate Change: A Natural Hazard. Multi-Science,
5. SMITH, Keith; Petley, David N. (2009) Environmental Hazards: Assessing Risk and Reducing Disaster. 5th Edition, Routledge, London, UK.

**Course Objectives:**

- i. To understand the relationship between climate change adaptations and disaster mitigations.
- ii. To have full comprehension of the activities of all stakeholders working for climate change adaptation and disaster management in Pakistan.

**Course Contents:**

- Introduction to climate change adaptations and disaster mitigations in Pakistan.
- Irrigation to combat aridity.
- Floods and its mitigation.
- Desertification and its mitigation.
- Drought and its mitigation.
- Landslide and its mitigation.
- Glaciers outburst and associated hazards management.
- Water shortage and its solutions.
- Government and public sector stakeholders.
- NGOs and community participation.
- Interlinking climate change adaptations and disaster mitigation.
- Mainstreaming climate change adaptation and disaster mitigation
- Forecasting of hydro-meteorological hazards.
- Tools for Climate Change Adaptation

**Recommended Books:**

1. BURROUGHS, William James (2007) Climate Change: A Multidisciplinary Approach. 2nd Edition, Cambridge University Press, UK.
2. CLAUSSEN, Eileen (2001) Climate Change: Science, Strategies, and Solutions. Brill Co.,
3. DAVID, Satterthwaite et al. (2007) Urban Development and Climate Change. Human Settlements Working Paper Climate Change and Cities 1, International Institute for Environment and Development.
4. KININMONTH, William (2004) Climate Change: A Natural Hazard. Multi-Science,
5. LEHMANN, Steffen (2010) The Principles of Green Urbanism: Regenerating the Post-Industrial City. Earthscan, London, UK.

**Course Objectives:**

- i. To understand the concept of desertification.
- ii. To know the causes and impacts of desertification on agro-based economy.

- iii. To enable the students to cope with desertification problem in their regions.

### **Course Contents:**

- Introduction to Desertification Hazard Management
- The Concept of Desertification
- The Geomorphic Processes of Wind, Water and Glacier Erosion
- Man and Environment Relation
- Overuse of Resources
- Deforestation and Desertification
- Aridity and Irrigation
- Waterlogging and Salinity
- Impacts of Desertification on Agro-based Economy
- Mitigation Measures for Desertification
- Institutions, NGOs, Community Role in Mitigation the Risk of Soil Fertility
- Case Studies of the Arid and Waterlogged Region

### **Recommended Books:**

1. ALSHARHAN, A.S.; Wood, W.W.; Goudie, A.S. Fowler, A. (2003) Desertification in Third Millennium. Proceedings of an International Conference, Dubai, 12-15 February 2000, Taylor and Francis,
2. CHOUHAN , T.S. (1992) Desertification in the World and its Control. Scientific Publishers,
3. JAIN, J. K. (1986) Combating Desertification in Developing Countries. UN Conference on Desertification, Scientific Publishers,
4. MARINI, Alberto; Talbi, Mohamed (2009) Desertification and Risk Analysis Using High and Medium Resolution Satellite Data. Springer,
5. MANNAVA, V.K.; Sivakumar, Ndegwa Ndiang'ui (2007) Climate and Land Degradation. Springer Berlin Heidelberg, Germany.

**DM 05**

## **Disaster Management and Economy of Pakistan**

**Cr. H. 3**

### **Course Objectives:**

- i. To understand various issues created by disasters and inappropriate disaster management in developing and emerging economies like Pakistan.
- ii. To enable the students for financial allocation made for disaster management and actual economic costs of natural hazards and disasters in Pakistan.

### **Course Contents:**

- Economic Resilience to Natural and Man-made disasters
- Disaster Management in the economic perspective of governance
- Resource allocations to DRR and its critical evaluation



- Impacts of disasters on Balance of Trade of Pakistan
- Impacts of disasters on economic growth of Pakistan
- Mainstreaming of Disaster Management into Economic Policies of Pakistan
- Economic costs of disasters to Pakistan's economy
- National Developmental Plans
- Role of Development Finance in Disaster Management
- Process of financing development in Pakistan
- Poverty eradication and sustainable livelihoods
- Demand and Supply of Development Finance
- Poverty Alleviation and Sustainable Livelihoods

### **Recommended Books:**

1. FENGLER, W., Ihsan, A., & Kaiser, K. (2008) Managing Post-Disaster Reconstruction Finance -- International Experience In Public Financial Management. Policy research working papers, 4475. Washington: The World Bank.
2. KHAN, M. A. (2007) Disaster preparedness for natural hazards: Current status in Pakistan. Kathmandu: International Centre for Integrated Mountain Development.
3. NATIONAL Disaster Management Authority (Pakistan) (2007) National disaster risk management framework Pakistan. Islamabad: National Disaster Management Authority, Govt. of Pakistan.
4. QURASHI, A., Tirmizi, S. M., & Rehman, N. (2006) In the wake of the earthquake. [Rawalpindi]: ISPR.
5. RASHID, A. (2006) The worst disaster of Pakistan: The calamity, agony and revival. Rawalpindi: Image Impact.
6. STATE Bank of Pakistan (Karachi) (2005) Handbook of statistics on Pakistan economy.

**DM 06**

**Disaster Management Policies**

**Cr. H. 3**

### **Course Objectives:**

- i. To enhance the policy analysis skills of the students.
- ii. To understand the disaster management framework and legislations in Pakistan in the context of global conventions.

### **Course Contents:**

- National Platforms for DRR
  - Definition, Need, Objectives, Principles, Composition, Major functions
- Guiding principles for policy
- Process of policy formulation, implementation and techniques in policy analysis

- Organizations with overall Disaster Management Responsibilities in Pakistan's public sector
- Disaster Management and National Plans
- Disaster Management in Regional Bodies
- Legislation for Disaster Management
  - Disaster Management Act 2010
  - ERRA Act 2011
  - Civil Defence Act, 1952
  - The National Calamities Act (West Pakistan Calamities Act), 1958
  - Local Government Ordinance, 2001
  - Emergency Services Ordinance, 2002
  - Environment Legislation
    - Pakistan Environmental Protection Act, 1997
    - Karachi Port Trust (Amendment) Ordinance, 1994
    - National Fund for Cultural Heritage Act, 1994
    - Agricultural Pesticides (Second Amendment) Ordinance, 1995
    - AJK Environmental Protection Act, 1996
    - Federal Environmental Rules and Regulations
  - National Disaster Management Ordinance – 2006
- Analytical review of the international policies and frameworks
  - Yokohama Strategy
  - The Geneva Mandate
  - Kyoto Protocol
  - Hyogo Framework for Action (HFA)

### **Recommended Books:**

1. BARDACH, E. (2000) A practical guide for policy analysis The eightfold path to more effective problem solving. New York, N.Y.: Chatham House Publishers, Seven Bridges Press. <http://www.netlibrary.com>
2. INTER-AGENCY Secretariat of the ISDR (2007) Hyogo Framework for Action 2005-2015: Building the resilience of nations and communities to disasters. Geneva: UN, ISDR
3. INTER-AGENCY Secretariat of the ISDR (2007) Words into action: A guide for implementing the Hyogo Framework. Geneva: UN, ISDR.
4. PINKOWSKI, J. (2008) Disaster management handbook. Boca Raton: CRC Press.
5. SINHA, P. C. (2006) Disaster management process: Law, policy and strategy. New Delhi: SBS Publishers & Distributors Pvt. Ltd.
6. STOKEY, E., & Zeckhauser, R. (1978) A primer for policy analysis. New York: W.W. Norton.

**Course Objectives:**

Aims to introduce the students to different disaster risk and vulnerabilities assessment and making them proficient in making such assessments for different types of disasters related to Pakistan. The students will be trained through field visits while asking them to prepare their own risk and vulnerabilities assessments for disaster prone areas.

**Course Contents:**

- Risk identification
  - Understanding of Risk and Hazards
  - Element at Risk and vulnerabilities
  - Types of vulnerabilities( social, political, economic and geographical)
  - Scale of vulnerabilities ( local, regional and national level)
- Risk perception
  - Theories of Risk Perception
  - Underlying factors for Risk Perception
  - Biases of Risk Perception
- Types, magnitude and frequency relationship
  - Risk and uncertainty
  - Certainty and probability
  - Hazard prediction - trend projection
  - Hazard prediction -magnitude/frequency analysis
  - Catastrophes
- Vulnerability and Capacity Assessment (VCA)
  - VCA ; Concepts and Definition
  - Purpose of VCA
  - Process of VCA
  - Outcome of a VCA
  - Community Based VCA
  - Disasters and vulnerability
  - Disasters and development
- Formulation of Spatial Data (GIS)
  - Spatial data quality, decision making and policy analysis
  - The need for spatial metadata
  - Deriving data quality information in GIS
  - Positional accuracy
  - Completeness and logical consistency
  - Attribute accuracy
  - Storing and displaying spatial metadata
- Spatial Analysis

- Hazard/ Risk mapping
  - Hazard Mapping and Risk Assessment
  - Elements of Hazard Mapping
  - Approaches & Methodologies: Qualitative and Quantitative Risk Mapping
  - Elements of Hazard Mapping
  - Data Requirements & Availability
  - Data Standardization
  - Target User
  - Scale
  - Cost and Accuracy
  - Types of Hazard Mapping
  - Flood
  - Landslide
  - Seismic
- Community Hazard Mapping
  - Need for Community Hazard Mapping
  - Process/ Methodologies
  - Community Threat
  - Scientific Information

### **Recommended Books:**

1. INTERNATIONAL Workshop on Disaster Risk Mitigation: Potential of Micro-Finance for Tsunami Recovery, Dhar Chakrabarti, P. G., & Bhat, M. R. (2006) Micro-finance and disaster risk reduction: Proceedings of International Workshop on Disaster Risk Mitigation: Potential of Micro-Finance for Tsunami Recovery New Delhi, October 14-15, 2005. New Delhi: National Institute of Disaster Management in association with Knowledge World.
2. UNITED States. (2002) Catastrophe insurance risks The role of risk-linked securities and factors affecting their use. [Washington, D.C.]: U.S. General Accounting Office
3. HANDBOOK: International Federation of Red Cross and Red Crescent Societies. What is VCA? An introduction to vulnerability and capacity assessment.
4. VULNERABILITY and Risk Assessment Disaster Management Training Programme [www.iaemeuropa.terapad.com/.../UN%20DMTP%20-%20Vulnerability.pdf](http://www.iaemeuropa.terapad.com/.../UN%20DMTP%20-%20Vulnerability.pdf)
5. DISASTER Risk Management and Vulnerability Reduction [www.adpc.net/infores/adpc-documents/PovertyPaper.pdf](http://www.adpc.net/infores/adpc-documents/PovertyPaper.pdf)
6. MULTI Hazard Risk Assessment using GIS [www.adpc.net/audmp/rllw/themes/th1-westen.pdf](http://www.adpc.net/audmp/rllw/themes/th1-westen.pdf)

**Course Objectives:**

- i. To provide a clear picture of the benefits of investment in Disaster Risk Reduction.
- ii. To understand the tools and techniques used for disaster risk financing.
- iii. To gain hands on knowledge of disaster risk financing.

**Course Contents:**

- Significance of Disaster Risk Financing
- Inter-regional disaster risk financing mechanisms
- Fiscal disaster risk financing mechanisms at the country level
- The role of public-private partnerships in disaster insurance
- Cost – Benefit Analysis of Disaster Risk Financing
- Risk Transfer and Finance
- Risk Financing Instruments
- Micro Credit in DRR
- The role of private disaster insurance in disaster risk financing
- Financial Arrangement for Disaster Management in Pakistan
  - Prime Minister's Disaster Relief Fund
  - Risk Mitigation Fund
  - Drought Emergency Relief Assistance

**Recommended Books:**

1. FROOT, K. (1997) The limited financing of catastrophe risk: An overview. Cambridge, MA: National Bureau of Economic Research.
2. GLOSEMEYER, L. (1987) Pooling for natural hazard loss and the federal program. Chapel Hill, N.C.: Center for Urban and Regional Studies, University of North Carolina at Chapel Hill.
3. INTERNATIONAL Workshop on Disaster Risk Mitigation: Potential of Micro-Finance for Tsunami Recovery, Dhar Chakrabarti, P. G., & Bhat, M. R. (2006) Micro-finance and disaster risk reduction: Proceedings of International Workshop on Disaster Risk Mitigation: Potential of Micro-Finance for Tsunami Recovery New Delhi, October 14-15, 2005. New Delhi: National Institute of Disaster Management in association with Knowledge World.
4. KREIMER, A. (1999). Managing disaster risk in Mexico Market Incentives for Mitigation Investment. Washington, D.C.: World Bank, Disaster Management Facility.
5. UNITED States. (2002) Catastrophe insurance risks The role of risk-linked securities and factors affecting their use. [Washington, D.C.]: U.S. General Accounting Office

**Course Objectives:**

- i. To understand the process of urbanization, its causes and impacts
- ii. To have knowledge of urban disasters, urban slum and squatter settlement
- iii. To have ability to cope with the risk of urban disasters

**Course Contents:**

- Introduction to Disasters Risk and Urbanization
- City Structure
- Population distribution in city and social classes
- Pattern of Urbanization in Developed and Developing Countries
- Urbanization (Definition, Causes, Impacts)
- Population distribution in city and social classes
- Problems of Urbanization
- Hazards in urban environment.
  - Fire, Chemical Hazards, nuclear, epidemics, flood, earthquake, windstorm, hailstorm etc.
- Vulnerabilities in urban areas.
  - Population distribution, Housing structure, Building codes, Accessibility, Emergency services etc.
  - Geology, hydrology, drainage, soil etc.
- Risk Reduction Measures.
  - Improvement of civic services.
  - Emergency response mechanism.
  - Hazard specific measures.

**Recommended Books:**

1. FERGUSON, Ronald F.; Dickens, William T. (1999) Urban Problems and Community Development. Brookings Institution Press.
2. PACIONE, Michael (1990) Urban Problems: An Applied Urban Analysis. Routledge Taylor & Francis Group,
3. PELLING, Mark; Wisner, Ben (2008) Disaster Risk Reduction: Cases from Urban Africa. Earthscan Publications Ltd., London, UK.
4. PUGH, Cedric (1996) Sustainability the Environment and Urbanisation. Earthscan, London, Uk
5. SHAW, Rajib; Srinivas, Hari; Sharma, Anshu (2009) Urban Risk Reduction: An Asian Perspective. Community, Environment and Disaster Risk, Emerald Group Publishing Limited.

**Course Objectives:**

To understand the nature, causes, consequences and remedies of the drought hazard.

**Course Contents:**

- Introduction to Drought Hazard Management
- Climatic Variables Distribution
- Arid and Semi-Arid Regions
- Man and Environment Dynamic Relationship
- Eco-System and Food Chain
- Threshold Population
- Drought (Definition, Perception and Variability from Region to Region)
- Types of Drought
- Causes of Drought
- Symptoms of Drought
- Consequences of Drought
- Impacts of Drought
- Mitigation Measures for Drought
- Sustainable Use of Resources
- Key Stakeholders in Drought Management
- Community Based Drought Mitigation
- Case Studies from Pakistan

**Recommended Books:**

1. AHMAD, S. H.; Qureshi, Z.; Majeed, R.; Saleem, M. (2004) Drought Mitigation in Pakistan: Current Status and Options for Future Strategies IWMI, Working . Paper 85.
2. LENA, M. Tallaksen; Van Lanen, A. J. (2004) Hydrological Drought: Processes and Estimation Methods for Stream Flow and Ground Water. Developments in Water Science, Elsevier, New York, US.
3. MANNAVA, V.K.; Sivakumar, Ndegwa Ndiang'ui (2007) Climate and Land Degradation. Springer Berlin Heidelberg, Germany.
4. RICHARD A. Warrick (1975) Drought hazard in the United States: A Research Assessment. University of Colorado Press, Boulder, Co., US.

**Course Objectives:**

To understand the nature, causes, consequences and remedies of the earthquake hazard.

**Course Contents:**

- Introduction to Earthquake Seismology
- Plate Tectonic and Elastic Rebound Theory

- Global Distribution of Earthquakes
- Folding, Faulting and Fault Lines
- Earthquake Hazard and Vulnerabilities
- Earthquake and Associated Secondary Hazards
- Seismic Zonation and Micro-Zonation
- Quantification of Earthquake Hazards
- Earthquake Hazard Reduction Measures (Structural and Non-Structural)
- Structure, Design and Material of the Buildings, Dams, Electrical Communication, Transportation etc.
- Preparedness (Individual, Family, Community, Early Warning System, Institutions, Awareness etc.)
- Increasing the Capacities and Decreasing the Vulnerabilities
- Response
- Retrofitting Techniques
- Earthquake Risk Analysis

### **Recommended Books:**

1. ALCÀNTARA-Ayala, Irasema; Goudie , Andrew (2010) Geomorphological Hazards and Disaster Prevention. Cambridge University Press, UK.
2. ANDRÉ Filiatrault (2002) Elements of Earthquake Engineering and Structural Dynamics. Presses Internationaels Poltechnique, France.
3. COBURN, Andrew; Spence Robin (2002) Earthquake Protection. John Wiley & Sons Ltd., New York, US.
4. DOWRICK, David (2003) Earthquake Risk Reduction. John Wiley & Sons Ltd., New York, US.
5. PRELIMINARY Damage and Needs Assessment Report of Pakistan 2005 Earthquake (2005). Prepared by Asian Development Bank and World Bank, Islamabad, Pakistan.

**DM 12**

**Economics of Disasters**

**Cr. H. 3**

### **Course Objectives:**

- i. To identify the positive role of economics in achieving disaster risk reduction.
- ii. To understand & use the tools and techniques for the proper assessment of disaster damages.

### **Course Contents:**

- Understanding the economic and financial impacts of disasters
- Economic Impacts of Disasters in Pakistan
- Nature of Economic Aid after Disasters
- Macro-economic impacts of disaster
- Micro-economic Impacts of Disasters
- Insurance Against Disaster Losses



- Financial and economic tools
- Effects of Disasters on Capital Accumulation
- Economic Resilience to Disasters
- Public Finance and Disasters
- Economic cost of Disasters
- Cost – Benefit Analysis of DRR
- Financing the Cost of Future Disasters
- Significance of Insurance in risk reduction across developing countries
- Making Disaster Risk Reduction and Insurance Work Together.

### **Recommended Books:**

1. JONES, E. C., & Murphy, A. D. (2009) The political economy of hazards and disasters. Lanham: AltaMira Press.
2. KERN, W. S. (2010) The economics of natural and unnatural disasters. Kalamazoo, Mich: W.E. Upjohn Institute for Employment Research
3. LOMBORG, B. (2007) Solutions for the world's biggest problems: Costs and benefits. Cambridge: Cambridge University Press
4. PELLING, M., Özerdem, A., & Barakat, S. (2002) The macro-economic impact of disasters. Emmitsburg, MD: National Emergency Training Center].
5. ROSE, A., & Liao, S.-Y. (2005) Modeling regional economic resilience to disasters: A computable general equilibrium analysis of water service disruptions. Emmitsburg, MD: National Emergency Training Center].
6. WORTHINGTON, A., & Valadkhani, A. (2004) Measuring the impact of natural disasters on capital markets: An empirical application using intervention analysis. Emmitsburg, MD: National Emergency Training Center.

**DM 13**

**EIA and Risk Assessment**

**Cr. H. 3**

### **Course Objectives:**

- i. To familiarize with the entire EIA / IEE processes for minimising occurrences of natural vs man-made disasters associated with new development schemes
- ii. To understand EIA techniques for impacts analysis of development projects in different sectors
- iii. To introduce EIA obligations under the PEPA, 1997 and EIA / IEE Regulations 2000 of the Govt. of Pakistan

### **Course Contents:**

- Introduction to Basic Concepts in Environment and its Main Components
- Interdependence / Interrelationship between the Environment and Development, Environment as Repository of Resources for Development, Development' Influence on the Environment

- IEE / EIA Concepts and its Rationale for New Development Projects / Programs
- Environmental Legislations (Pakistan Environmental Protection Ordinance 1983, Pakistan Environmental Protection Act 1997), Main Features and Legislative Provisions for IEE / EIA
- Public Involvement in EIA: Public Consultation, Review and Public Hearing for Minimization of Adverse Impacts Causative of Potential Disasters.
- IEE / EIA Regulations 2000, Public Participation and Post Auditing / Monitoring under the Regulations
- Overview of EIA Processes and its Relation / Integration at the Project Level
- EIA Methodologies, Concept and their Classification vis a vis Advantages and Disadvantages of Different Methodologies, Categorisation of Development Projects and Impacts Analysis of Sectoral Development Projects
- Baseline Data Collection and Impacts Predictions in EIA
- Mitigation Measures and Development of Environmental Management Plan (EMP)

### **Recommended Books:**

1. CLARK, B. D., Chapman, K., Bisset, R, Wathern, P. and Barret, M., (2001) A Manual for the Assessment of Major Developments: London.
2. ESCAP (1985) Environmental Impact Assessment: Guidelines for Planners and Decision Makers, ESCAP, Bangkok.
3. GOVERNMENT of Pakistan (GoP), (1997) Pakistan Environmental Protection Act 1997, Gazette of Pakistan.
4. GOVERNMENT of Pakistan (GoP), (2000), Review of Initial Environmental Examination and Environmental Impact Assessment Regulations 2000, Ministry of Environment, LG & RD, Islamabad.
5. UNITED Nations Environment Programme, (1988) Environmental Impact Assessment: Basic Procedures for Developing Countries. UNEP, Nairobi.
6. WATHERN, P. (2000) Environmental Impact Assessment: Theory and Practice, Academic Division of Unwin Hyman Ltd.

**DM 14**

**Management of Flood Hazard**

**Cr. H. 3**

### **Course Objectives:**

To understand the nature, causes, consequences and remedies of the flood hazard.

### **Course Contents:**

- Introduction to Flood Hazard
- General Characteristics of Flood
- Causes of Floods

- Meteorological
- Hydrological
- Anthropogenic
- Flood Intensifying Conditions
- Types of Floods (Riverine flood , Flash flood, Coastal flood, GLOF)
- Impacts of flood
- Basic Principles in Flood Hazard Assessment
- Integrated Flood Risk Management
- Flood and Development Challenges
- Flood Mitigation Measures
  - Structural (Engineering Protection)
  - Non-structural (Planning and Policies)
- Early Warning System for Floods

### **Recommended Books:**

1. HEWITT, K. (1997) Regions of Risk: A Geographical introduction to disaster, Harlow, Longman.
2. KUMAR, N (2006) Disaster Management Progressive international Agencies (PVT) Limited, New Delhi, India.
3. MARTINI (2002) Flood & Mega flood Process and Deposit: Recent & Ancient Examples Multi-Lines Books Lahore. Pakistan
4. ROSENFELD, C. (1994) Flood Hazards Reduction: GIS maps, survival strategies in Bangladesh. Geo Info Systems, Dacca.
5. SMITH, K. (1992) Environmental Hazards: Assessing and reducing disasters. Routledge, London, UK.
6. WISNER, Piers Blaike (2004) At Risk- Natural Hazards, Peoples, Vulnerability and Disaster, Ben Vanguard Books (PVT) Limited Lahore.

**DM 15**

## **Forecasting of Hydro-Meteorological Hazards**

**Cr. H. 3**

### **Course Objectives:**

- i. To understand the causes, consequences and impacts of hydro-meteorological hazards.
- ii. To learn the forecasting techniques of hydro-meteorological hazards.

### **Course Contents:**

- Introduction to the forecasting of hydro-meteorological hazards.
- Meteorology
- Vertical and horizontal distribution of temperature and pressure.
- Types of clouds and precipitation.
- Measuring instruments.
- Weather phenomenon
- Weather forecast and tools
- Physiography Meteorology and Hydrology
- Types of hydro-meteorological hazards.

- Basic elements of hydro-meteorological hazards (Intensity, density, exposed population and property)
- Measuring and presentation of the hydro-meteorological hazards (Scale, level and end user).
- Use of modern technology.
- Major stakeholders (Government, public and international institutions).
- Forecasting of hydro-meteorological hazards.
- Early warning system for different hazards.

### **Recommended Books:**

- 1 CAMPUS, Stefano et al. (2007) Evaluation and Prevention of Natural Risks (Balkema-Proceedings and Monographs in Engineering, Water, an). Taylor & Francis, 1 Edition, UK.
- 2 MILES, Elizabeth (2005) Forecasting the Weather. Heinemann-Raintree, UK.
- 3 RODGERS, Alan; Streluk, Angella (2007) Forecasting the Weather (Measuring the Weather). Heinemann Educational Books, UK.
- 4 SENE, Kevin (2010) Hydrometeorology: Forecasting and Applications. Springer, Berlin, Germany.
- 5 SINGH, R. P.; Vijay, P. (2009) Applied Hydrometeorology. Springer and Capital Publishing Company, ISBN: 978-1-4020-9843-7

**DM 16**

## **Gender Mainstreaming in Disaster Management**

**Cr. H. 3**

### **Course Objective:**

To know the impacts of disaster on women and to study the contribution of women in disaster management.

### **Course Contents:**

- Gender and gender relations in disasters
- Women in society
- Perspective of gender: A missing element in disaster
- Gender inequality, vulnerability and disaster
- Gender Specific Needs and Issues
- Differential impact of disaster on women in different life cycle stages
- Role of women in disaster management
- Women involvement in reconstruction and development phase following an emergency and/or disaster
- Psychosocial considerations: prevention, mitigation and preparedness
- Community mobilization through women
- Case studies of women responding to disaster
- Gender Equality and Human Development Outcomes: Enhancing Capabilities
- Case Studies

### **Recommended Books:**

1. ANDERSEN, ML. and Dana, Hysock (2006) Thinking about Women: Sociological Perspectives on Sex and Gender. Allen & Bacon, New York.
2. ARIYABANDU, M. M. and Wickramasinghe, Maithree. (2005) Gender Dimension in Disaster. Raj Press, New Delhi.
3. ENARSON, Elaine and Morrow Betty H. (2000). The Gendered Terrain of Disaster: Through Women's Eyes. International Hurricane centre. USA
4. KATHY, D., Mary, E. and Lorber, J (2006) Handbook of Gender and Women's studies, Sage, UK
5. MYERS, Mary (1994). Women and Children first. Introducing gender strategy in disaster preparedness, Oxfordshire: Carfax publishing limited.
6. PHILLIPS, B.D. and Morro, B.H. (2008) Women and Disasters. Bloomington: Xlibris Corporation (United States).

**DM 17**

**Geomorphology and Natural Hazards**

**Cr. H. 3**

### **Course Objectives:**

- i. To know the relationship between geomorphic processes and natural hazards.
- ii. To understand the role of the man in the modification of the environment.
- iii. To apply the geomorphic techniques in the study of natural hazards.

### **Course Contents:**

- Introduction to Geomorphology (Scope and Importance, Geomorphology and Environment, Geomorphic Change and Man)
- Geomorphic Processes
- Classification of Geomorphic Processes
- Monitoring Geomorphological Changes in the Environment
- Endogenous Hazards
  - Earthquakes
  - Volcanism
- Exogenous Hazards
  - Rivers and Flood Plains and Flooding
  - Drought
  - Glacial and Associated Hazards
  - Soil Erosion by Water and Wind
  - Weathering, Causes, Implication
  - Desertification, Causes and Implication
  - Mass Movement Hazards
- Mapping Geomorphology
- Techniques of Geomorphological Mapping

- Geomorphology and Environmental Management
- Geomorphology in Disaster Planning and Management

### **Recommended Books:**

1. AMALKAR, K. Sen (1993) Desertification and its control in the Thar, Sahara and Sahel Regions. Scientific Publishers, Jodpur, India.
2. CAMPUS, Stefano et al. (2007) Evaluation and Prevention of Natural Risks (Balkema-Proceedings and Monographs in Engineering, Water, an). Taylor & Francis, 1<sup>st</sup> Edition, UK.
3. COOKE, R. U. and Doornkamp, J. C. (1990) Geomorphology in Environmental Management (New Edition). Clarendon Press Oxford.
4. COSTA, J. E. and Baker, V. R. (1981) Surficial Geology: Building with Earth. John Wiley and Sons, New York, US.
5. CROUHY, Michel; Galai, Dan; Mark, Robert; (2005) The Essentials of Risk Management. The McGraw-Hill Co., US.
6. DAMON, P. C. (2006) Introduction to International Disaster Management. Butterworth-Heinemann, UK
7. SABH, M. I. El & t. S. Murty (1988) Natural and Manmade Hazards. Academic Publisher Group.

**DM 18**

**Hazard Mapping**

**Cr. H. 3**

### **Course Objectives:**

- i. To know the hazard mapping.
- ii. To learn various method and techniques of hazard mapping.

### **Course Contents:**

- Introduction to Techniques of Hazards Mapping
- Maps (Definition, Importance and Use)
- Types of Maps (Scale, Purpose and Content)
- Basic Elements of a Map
- Map Making Techniques
  - Sketch Map
  - Drawing Tools
  - Surveying Tools
  - Computer Aided Cartography
  - GIS
  - Multi-Tool Mapping
- Types of Hazards
- Global Distribution of Hazards
- Spatial Distribution of a Hazard
- Basic Elements of a Hazards to be Mapped
- Hazard and Scale of a Map (Level of the Representation of a Hazard)
- Limitation of Hazards Mapping
- Drought Hazard Mapping

- Earthquake Hazard Mapping
- GIS Software and Hazards Mapping

### **Recommended Books:**

1. BOBROWSKY, Peter T. (2001) Geo-Environmental Mapping: Methods, Theory and Practice. Taylor and Francis,
2. COOKE, R. U. and Doornkamp, J. C. (1990) Geomorphology in Environmental Management (New Edition). Clarendon Press Oxford.
3. PECKHAM, Robert Joseph and Jordan, Gyozo (2007) Digital Terrain Modelling: Development and Applications in a Policy Support Environment. Series: Lecture Notes in Geoinformation and Cartography, Springer, Berlin, Germany.
4. ROBINSON, H.; Morrison, Joel L.; Muehrcke, Phillip C. and Kimerling, A. J. (1995) Elements of Cartography. J. Wiley Co., New York, USA

**DM 19**

## **Impacts of Climate Change and Disasters in Pakistan**

**Cr. H. 3**

### **Course Objectives:**

- i. To know causes and impacts of climate change.
- ii. To understand the consequences of climate change impacts and disasters.
- iii. To have knowledge of the role of Pakistan in climate change and its impacts on country's economy.

### **Course Contents:**

- Introduction to impacts of climate change and disasters in Pakistan
- Indicators of climate change
- Causes of climate change.
- Extreme natural events and climate change
- Industrialisation, deforestation and environmental hazards
- Causes vs. impacts in global perspective
- Pakistan role in climate change
- Impacts of climate change in Pakistan
- Climate change and hazards vulnerabilities in Pakistan
- Agro-based economy and hydro-meteorological disasters
- Climate Change Policy of Pakistan
- Case Studies

### **Recommended Books:**

1. CLAUSSEN, Eileen (2001) Climate Change: Science, Strategies, and Solutions. Brill Co.,
2. COOKE, R. U.; Doornkamp, J. C. (1990) Geomorphology in Environmental Management. Clarendon Press Oxford.
3. DAVID, Satterthwaite et al. (2007) Urban Development and Climate Change. Human Settlements Working Paper Climate Change and Cities 1, International Institute for Environment and Development.

4. GOVERNMENT of Pakistan (GOP) (1981) Environmental Profile of Pakistan. Environment and Urban Affairs Division, Government of Pakistan, Islamabad.
5. SABH, M. I. El & t. S. Murty (Eds.) (1988) Natural and Manmade Hazards. Academic Publisher Group.

**DM 20**

## **Management of Landslide Hazard**

**Cr. H. 3**

### **Course Objectives:**

To understand the nature, causes, consequences and remedies of the landslide hazard.

### **Course Contents:**

- Introduction to Landslide Hazard Management
- Mass-Movement and Landslide
- Factors Responsible for Triggering the Landslides
- Inventory of the Landslide Hazards
- Classification of Landslides
- Slope Stability and Instability and their Classification
- Elements at Risk
- Landslide Risk Assessment
- Community Based Landslide Hazard Management
- Slope Stabilization
  - Engineering Methods
  - Bio-Engineering Methods
  - Soil Bio-Engineering Methods
- Preparedness (Community, Institutions, Awareness, Projects, Early Warning System etc.)
- Case Studies from Pakistan

### **Recommended Books:**

1. ALCÀNTARA-Ayala, Irasema; Goudie , Andrew (2010) Geomorphological Hazards and Disaster Prevention. Cambridge University Press.
2. FIELD Manual on Slope Stabilization (2008) United Nations Development Programme - Pakistan, Environmental Recovery Programme, Islamabad.
3. GLADE, Thomas; Anderson, Malcolm; Crozier, Michael J. (2005) Landslide Hazard and Risk. John Wiley & Sons Ltd., New York, US.
4. SASSA, Kyōji; Canuti, Paolo (2008) Landslides - Disaster Risk Reduction ,Verlag-Springer .Berlin, Germany.



**Course Objectives:**

- i. To focus on the interdependence of disasters and livelihoods.
- ii. To open up ward causal impact relationships between disasters and livelihoods..
- iii. To explore the strategies for the adaptation of sustainable positive relation between disasters and livelihoods.

**Course Contents:**

- Introduction to Livelihood Assets
- The sustainable livelihood framework
- Vulnerability context of the livelihood framework
- Concept of Interdependence of Disaster Risk Reduction, Vulnerability and Livelihoods
- Disaster Risk Reduction a necessity for Sustainable Development
- Investment in DRR for sustainable livelihoods
- Risk Reduction with sustainable livelihood
- Enhancing resilience of and through livelihoods
- Supply chains and natural hazards
- Vulnerable livelihoods and risk factors
- Best Practices in Livelihoods

**Recommended Books:**

1. ARIYABANDU, M. M., & Bhatti, A. (2005) Livelihood centred approach to disaster management: A policy frame work for South Asia. Colombo: ITDG South Asia and Rural Development Policy Institute (RDPI), Islamabad
2. CLOT, N., & Carter, J. (2009) Disaster risk reduction: A gender and livelihood perspective. InfoResources focus no. 2/09. Zollikofen, Switzerland: InfoResources.
3. DOWNING, T. E. (2002) Linking Sustainable Livelihoods and Global Climate Change in Vulnerable Food Systems. ERDE -BERLIN-. 133, 363-378.
4. FOOD and Agriculture Organization of the United Nations, & International Labour Organization. (2008). The livelihood assessment tool-kit Analysing and responding to the impact of disasters on the livelihoods of people. Rome: Food and Agriculture Organization. [http://www.fao.org/fileadmin/templates/tc/tce/pdf/Livelihood\\_Assessment\\_Toolkit.pdf](http://www.fao.org/fileadmin/templates/tc/tce/pdf/Livelihood_Assessment_Toolkit.pdf).
5. KABIR, M. A. (2000) The vulnerable livelihoods of slum dwellers: A study on Dhaka city. The Hague: ISS.
6. KRISHNA, S. (2004) Livelihood and gender: Equity in community resource management. New Delhi: Sage Publications.

**Course Objectives:**

- i. To understanding various hazards and disasters occurring in Pakistan.
- ii. To know the importance and relevance of mechanisms for preparedness and management of disastrous situation in the context of Pakistan.
- iii. To provide full comprehension of the disaster planning cycle, including disaster risk reduction, early warning and management of recovery process.

**Course Contents:**

- Introduction to Planning for Disaster Management
- Significance of disaster planning and management
- Physical feature and climate of Pakistan
- Risk and vulnerability to hazards and disasters in Pakistan
- Basic concept of Disaster Management Cycle i.e. prevention, mitigation, preparedness, disaster impact, response, recovery and development
- Awareness and preparedness to natural hazards and disasters in the country;
- Vulnerability analysis
- National Disaster Management Policy
- Major requirements for coping with disasters i.e. Organization, Planning and Training needs
- Modern challenges and Disaster management
- Damage assessment, evacuation, rehabilitation and recovery
- Formulation of Disaster Management Plan
- Existing Institutions and Hazard-Reduction Policies in Pakistan
- Natural Hazards Risk and National Development

**Recommended Books:**

1. AHMAD, N. and Qureshi, I. A. (1995) Disaster Management in Punjab: A study of flood management in district Jhelum. Pakistan Academy for Rural Development, Peshawar.
2. BIRKMANN, J. (2006) Measuring Vulnerability to Natural Hazards: Towards disaster resilient societies. Tokyo, United Nations University Press.
3. FOSTER, H.D. (1980) Disaster Planning: The preservation of life and property. Berlin, Springer Verlag.
4. HEWITT K. (1997) Regions of Risk: A Geographical introduction to disaster, Harlow, Longman.
5. KHAN, A.N. (1996) Planning for Reduction of Flood Hazard. Proceeding of Pakistan Geographical Association, Bahawalpur Conference.
6. McENTIRE, D. (2007) Disaster Response and Recovery: New Jersey, Oxford, UK.

**Course Objectives:**

To understand the psychological impacts of disasters and their remedies.

**Course Contents:**

- Trauma response
  - Normal response, Basic principle, Bio psychosocial model, cultural influences.
- Classification of Psychological Disorders
  - Depression, Anxiety, Post- traumatic stress disorder.
- Children in Disasters
  - Development tasks, risk factors, and childhood traumatic grief.
- Psychological support
  - Psychological first aid, coping strategies, and resiliency models.
- Community Mental health program

**Recommended Books:**

1. ALLEN, J.G (1995) Coping with trauma: A Guide to self-understanding. Washington D.C: American psychiatric press.
2. OLLENDICK, T.H., & Cerry, J. (1981) Clinical Behaviour therapy with children. New York: plenum press.
3. WORDEN, J.W. (1991).Grief counseling and Grief therapy: A handbook for the mental health professional New York: Springer Publishing Co.

**Course Objective:**

- i. To provide students with a framework for thinking about disasters in sociological terms and events.
- ii. To provide understanding of special sociological issues such as race, class, gender and family in disaster.

**Course Contents:**

- Sociology and the Study of Disaster
- Social System Ecological Networks and Disaster
- Sociological Perspective on Disaster
- Role of Faith, Belief and Religion in Disasters
- Myths, Realities and Cultural Representation of Disaster
- Behavioural Response to Disaster
- Community Impact of Disaster
- Social Capital and Disaster
- Social Vulnerability and Theories of Social Vulnerability
- Disaster, Race and Social Class

- Gender and Disaster
- Children and Disaster
- Elderly and Disaster
- Consequences of Post disaster relocation and prospects for recovery
- Disaster, language barrier and disabilities
- Disaster and social change

### **Recommended Books:**

1. ANDERSEN, ML. and Dana, Hysock (2006) Thinking about Women: Sociological Perspectives on Sex and Gender. Allen & Bacon, New York.
2. ALBROW, Martin (1999) Sociology the Basic. Routledge, London.
3. BROOM, Leonard and Selznick (1990) Sociology. Harper and Row Publisher, London.
4. FISCHER, Henry W. (1998) Response to Disaster: Fact versus Fiction & Its Perpetuation. The Sociology of Disaster. 2<sup>nd</sup> Edition. University Press of America, Lanham, Maryland.
5. ERIKSON, Kai (1976) Everything in Its Path. Simon and Schuster, New York.
6. PRESTON, Richard. (1994) The Hot Zone. Random House, New York.

**DM 25**

**Media and Disaster Management**

**Cr. H. 3**

### **Course Objectives:**

- i. To understand the role of various basic disciplines of engineering
- ii. Role of various engineering codes, guidelines and specifications
- iii. History of disasters with specific emphasis to Pakistan in context of engineering

### **Course Contents:**

- Disasters and the media in a global age
- The geopolitics of disaster coverage
- Making disasters mean and politically matter
- The making of a newsroom and news editing
- Disaster citizenship and assumption of state responsibility
- Accountability of disaster news: ethics of disaster reporting
- Social media and disaster
  - The evolution of use of social media in disasters
  - Using social media as one part of comprehensive disaster communication programme
  - Future trends in the use of digital media and its challenges
- Essentials of successful disaster communication
- Learning the application of communication principles in different phases of disasters
- Understanding disaster communications audience

- Managing media relations as a disaster manager
- Building an effective plan, strategy and skill for disaster communication in a changing media world
- Terrorism communication challenges
- Understanding the role of partners/stakeholders in disaster communication
- Class project: Learning best practices of the use of media in disasters through Case studies of successful and failed disaster communication

### **Recommended Books:**

1. Disasters and the Media by Mervi Pannti, Karin Wahl-Jorgensen and Simon Cottle (2012), Peter Lang, New York
2. Disaster Communications in a Changing Media World, Second Edition by George Haddow, Kim S Haddow (2014), Elsevier, New York
3. Reporting Disasters: Famine, Aid, Politics and the Media by Suzanne Franks (Mar 1, 2014), Hurst, London.

**DPM 26**

## **Contingency Planning in Disaster Management**

**Cr. H. 3**

### **Course Objectives:**

- i. To understand the role of various basic disciplines of engineering
- ii. Role of various engineering codes, guidelines and specifications
- iii. History of disasters with specific emphasis to Pakistan in context of engineering

### **Course Contents:**

- Introduction to contingency Planning
- Preparedness: Organization. Training, Planning and/or Plans
- Contingency Planning and its Process
  - Hazard and risk analysis, contingency prioritization
  - Scenario building
  - Preparing a contingency plan for each selected scenario
  - Rescue, relief, and evacuation planning
- Monitoring and updating the contingencies plan. Plan Preparation: Level, Components, Viability, Check list etc.
- Dynamic Nature of Disaster Management
- Contingency Planning - Planning Continuum
- Methodology & Steps
- Content of the contingency Plan
- Time Line
- Likely Actions at Federal, Provincial and District levels
- Monsoon Contingency Plan
- Case Studies

## **Recommended Books:**

1. BIRKMANN, J. (2006) Measuring Vulnerability to Natural Hazards: Towards Disaster Resilient Societies. Tokyo, United Nations University Press.
2. DAMON, P. C. (2006) International Disaster Management. Butterworth-Heinemann.
3. DAMON, P. C. (2006) Introduction to International Disaster Management. Butterworth-Heinemann, UK.
4. DILLEY, Max (2005) Natural Disaster Hotspots: A Global Risk Analysis. World Bank and University of Columbia, US.
5. ELLIOT, J.E. (2006) An Introduction to Sustainable Development. Third Edition. Routledge, London UK.
6. HEWITT, K. (1997) Regions of Risk: A Geographical Introduction to Disaster. Harlow, Longman, New York, US.
7. SMITH, Keith and Petley, David N. (2009) Environmental Hazards: Assessing Risk and Reducing Disaster Routledge, London, UK.

## **RECOMMENDATIONS BY NCRC FOR THE IMPLEMENTATION OF BS/MS DISASTER MANAGEMENT**

1. Recognition of DM Programme
  - 1.1. Recognition of Disaster Management as a science subject by the HEC and other National bodies.
  - 1.2. Disaster Management must be treated at par with other basic sciences by the HEC.
  - 1.3. Opening of Disaster Management Departments in all general public and private sector universities of the country.
  - 1.4. Facilitate curricula development at School and College levels through relevant bodies.
  - 1.5. The broad spectral domain of Disaster Management provides an opportunity for a wide range of useful multi-disciplinary associations with other subject areas. Therefore, HEC is to advise the institutions to provide maximum range of combinations both with BS science and humanities groups.
2. Labs/Equipment
  - 2.1. Provision of computers for Disaster Management labs. There should be Central Computer lab in each institution/colleges to provide computing facility to the different disciplines of sciences including Disaster Management. The GIS and Remote Sensing software should be provided at least to the post graduate level institution where Disaster Management is taught.
  - 2.2. Sufficient funds should be allocated by the Institutions for the purchase of teaching aids, surveying and computing equipment/instruments, GPS and other field surveys equipment.

### 3. Workshops/Seminars/Conferences

- 3.1. National level workshop should be organized by HEC to discuss the problems related to the implementation for 4 year BS and 2 year MS Disaster Management curriculum at the national level.
- 3.2. Workshops/seminars/conferences should be arranged at regular interval for the capacity building of all stakeholders related to disaster management.
- 3.3. Facilitating knowledge sharing through workshops, seminars and conferences among scientific community.

### 4. Library Facilities

- 4.1. Development of well-equipped seminar libraries and provision of funds for appropriate collection of journals, literature and reference material including government publications.
- 4.2. HEC to facilitate publication of monographs, reports and books in Disaster Management.
- 4.3. HEC to provide robust, internet facility for access to online journals, e-books, reports, satellite data and video streaming.

### 5. Research Support

HEC to provide adequate funds for field works/research works related to Disaster Management to the institutions.

### 6. Refresher Courses

- 6.1. Organizing refresher courses regularly for postgraduate teachers in collaboration with NDMA, PDMAs, RESCUE 1122, Survey of Pakistan, Meteorological Department of Pakistan, Geological Survey of Pakistan, and SUPARCO etc. related to Instrumental Surveying, GIS, Remote Sensing, Emergency Response Management, Disaster Risk Assessment etc.
- 6.2. Refresher courses should be arranged at regular intervals for all teachers (Disaster Management) to keep them abreast with continuing changes in the discipline in the given fields.
- 6.3. The HEC may advise subordinate institutions to run short-term courses during summer vacation within the ramifications of disaster management enabling disaster management teachers to enhance their knowledge.

**COMPULSORY COURSES IN ENGLISH FOR BS  
(4 YEAR) IN BASIC & SOCIAL SCIENCES**

**English I (Functional English)**

**Objectives:** Enhance language skills and develop critical thinking.

**Course Contents:**

Basics of Grammar  
Parts of speech and use of articles  
Sentence structure, active and passive voice  
Practice in unified sentence  
Analysis of phrase, clause and sentence structure  
Transitive and intransitive verbs  
Punctuation and spelling

**Comprehension**

Answers to questions on a given text

**Discussion**

General topics and every-day conversation (topics for discussion to be at the discretion of the teacher keeping in view the level of students)

**Listening**

To be improved by showing documentaries/films carefully selected by subject teachers

**Translation skills**

**Urdu to English**

**Paragraph writing**

Topics to be chosen at the discretion of the teacher

**Presentation skills**

Introduction

*Note: Extensive reading is required for vocabulary building*

**Recommended Books:**

1. **Functional English**
  - a) Grammar
    1. Practical English Grammar by A.J. Thomson and A.V. Martinet. Exercises 1. Third edition. Oxford University Press. 1997. ISBN 0194313492



2. Practical English Grammar by A.J. Thomson and A.V. Martinet. Exercises 2. Third edition. Oxford University Press. 1997. ISBN 0194313506
- b) Writing
  1. Writing. Intermediate by Marie-Christine Boutin, Suzanne Brinand and Françoise Grellet. Oxford Supplementary Skills. Fourth Impression 1993. ISBN 0 19 435405 7 Pages 20-27 and 35-41.
- c) Reading/Comprehension
  1. Reading. Upper Intermediate. Brain Tomlinson and Rod Ellis. Oxford Supplementary Skills. Third Impression 1992. ISBN 0 19 453402 2.
- d) Speaking

## **English II (Communication Skills)**

**Objectives:** Enable the students to meet their real life communication needs.

### **Course Contents:**

#### **Paragraph writing**

Practice in writing a good, unified and coherent paragraph

#### **Essay writing**

Introduction

#### **CV and job application**

Translation skills

Urdu to English

#### **Study skills**

Skimming and scanning, intensive and extensive, and speed reading, summary and précis writing and comprehension

#### **Academic skills**

Letter/memo writing, minutes of meetings, use of library and internet

#### **Presentation skills**

Personality development (emphasis on content, style and pronunciation)

*Note: documentaries to be shown for discussion and review*

### **Recommended Books:**

#### **Communication Skills**

- a) Grammar
  1. Practical English Grammar by A.J. Thomson and A.V. Martinet. Exercises 2. Third edition. Oxford University Press 1986. ISBN 0 19 431350 6.

- b) Writing
  1. Writing. Intermediate by Marie-Christine Boutin, Suzanne Brinand and Françoise Grellet. Oxford Supplementary Skills. Fourth Impression 1993. ISBN 019 435405 7 Pages 45-53 (note taking).
  2. Writing. Upper-Intermediate by Rob Nolasco. Oxford Supplementary Skills. Fourth Impression 1992. ISBN 0 19 435406 5 (particularly good for writing memos, introduction to presentations, descriptive and argumentative writing).
- c) Reading
  1. Reading. Advanced. Brian Tomlinson and Rod Ellis. Oxford Supplementary Skills. Third Impression 1991. ISBN 0 19 453403 0.
  2. Reading and Study Skills by John Langan
  3. Study Skills by Richard York.

## **English III (Technical Writing and Presentation Skills)**

**Objectives:** Enhance language skills and develop critical thinking

### **Course Contents:**

#### **Presentation skills**

#### **Essay writing**

Descriptive, narrative, discursive, argumentative

#### **Academic writing**

How to write a proposal for research paper/term paper

How to write a research paper/term paper (emphasis on style, content, language, form, clarity, consistency)

#### **Technical Report writing**

#### **Progress report writing**

*Note: Extensive reading is required for vocabulary building*

### **Recommended Books:**

#### Technical Writing and Presentation Skills

- a) Essay Writing and Academic Writing
  1. Writing. Advanced by Ron White. Oxford Supplementary Skills. Third Impression 1992. ISBN 0 19 435407 3 (particularly suitable for discursive, descriptive, argumentative and report writing).

2. College Writing Skills by John Langan. McGraw-Hill Higher Education. 2004.
  3. Patterns of College Writing (4<sup>th</sup> edition) by Laurie G. Kirszner and Stephen R. Mandell. St. Martin's Press.
- b) Presentation Skills
- c) Reading
- The Mercury Reader. A Custom Publication. Compiled by northern Illinois University. General Editors: Janice Neulib; Kathleen Shine Cain; Stephen Ruffus and Maurice Scharon. (A reader which will give students exposure to the best of twentieth century literature, without taxing the taste of engineering students).

**Pakistan Studies (Compulsory)**

**Introduction/Objectives:**

- Develop vision of historical perspective, government, politics, contemporary Pakistan, ideological background of Pakistan.
- Study the process of governance, national development, issues arising in the modern age and posing challenges to Pakistan.

**Course Outline:**

**1. Historical Perspective**

- a. Ideological rationale with special reference to Sir Syed Ahmed Khan, Allama Muhammad Iqbal and Quaid-i-Azam Muhammad Ali Jinnah.
- b. Factors leading to Muslim separatism
- c. People and Land
  - i. Indus Civilization
  - ii. Muslim advent
  - iii. Location and geo-physical features.

**2. Government and Politics in Pakistan**

Political and constitutional phases:

- a. 1947-58
- b. 1958-71
- c. 1971-77
- d. 1977-88
- e. 1988-99
- f. 1999 onward

**3. Contemporary Pakistan**

- a. Economic institutions and issues
- b. Society and social structure
- c. Ethnicity
- d. Foreign policy of Pakistan and challenges
- e. Futuristic outlook of Pakistan

**Recommended Books:**

1. Burki, Shahid Javed. *State & Society in Pakistan*, The Macmillan Press Ltd 1980.
2. Akbar, S. Zaidi. *Issue in Pakistan's Economy*. Karachi: Oxford University Press, 2000.
3. S.M. Burke and Lawrence Ziring. *Pakistan's Foreign Policy: An Historical analysis*. Karachi: Oxford University Press, 1993.
4. Mehmood, Safdar. *Pakistan Political Roots & Development*. Lahore, 1994.

5. Wilcox, Wayne. *The Emergence of Bangladesh.*, Washington: American Enterprise, Institute of Public Policy Research, 1972.
6. Mehmood, Safdar. *Pakistan Kayyun Toota*, Lahore: Idara-e-Saqafat-e-Islamia, Club Road, nd.
7. Amin, Tahir. *Ethno - National Movement in Pakistan*, Islamabad: Institute of Policy Studies, Islamabad.
8. Ziring, Lawrence. *Enigma of Political Development*. Kent England: WmDawson & sons Ltd, 1980.
9. Zahid, Ansar. *History & Culture of Sindh*. Karachi: Royal Book Company, 1980.
10. Afzal, M. Rafique. *Political Parties in Pakistan*, Vol. I, II & III. Islamabad: National Institute of Historical and cultural Research, 1998.
11. Sayeed, Khalid Bin. *The Political System of Pakistan*. Boston: Houghton Mifflin, 1967.
12. Aziz, K.K. *Party, Politics in Pakistan*, Islamabad: National Commission on Historical and Cultural Research, 1976.
13. Muhammad Waseem, *Pakistan Under Martial Law*, Lahore: Vanguard, 1987.
14. Haq, Noor ul. *Making of Pakistan: The Military Perspective*. Islamabad: National Commission on Historical and Cultural Research, 1993.

**ISLAMIC STUDIES  
(Compulsory)**

**Objectives:**

This course is aimed at:

- 1 To provide Basic information about Islamic Studies
- 2 To enhance understanding of the students regarding Islamic Civilization
- 3 To improve Students skill to perform prayers and other worships
- 4 To enhance the skill of the students for understanding of issues related to faith and religious life.

**Detail of Courses:**

**Introduction to Quran Studies**

- 1) Basic Concepts of Quran
- 2) History of Quran
- 3) Uloom-ul -Quran

**Study of Selected Text of Holly Quran**

- 1) Verses of Surah Al-Baqra Related to Faith (Verse No-284-286)
- 2) Verses of Surah Al-Hujrat Related to Adab Al-Nabi (Verse No-1-18)
- 3) Verses of Surah Al-Mumanoon Related to Characteristics of faithful (Verse No-1-11)
- 4) Verses of Surah al-Furqan Related to Social Ethics (Verse No.63-77)
- 5) Verses of Surah Al-Inam Related to Ihkam(Verse No-152-154)

**Study of Selected Text of Holly Quran**

- 1) Verses of Surah Al-Ihzab Related to Adab al-Nabi (Verse No.6,21,40,56,57,58.)
- 2) Verses of Surah Al-Hashar (18,19,20) Related to thinking, Day of Judgment
- 3) Verses of Surah Al-Saf Related to Tafakar,Tadabar (Verse No-1,14)

**Seerat of Holy Prophet (S.A.W) I**

- 1) Life of Muhammad Bin Abdullah ( Before Prophet Hood)
- 2) Life of Holy Prophet (S.A.W) in Makkah
- 3) Important Lessons Derived from the life of Holy Prophet in Makkah

**Seerat of Holy Prophet (S.A.W) II**

- 1) Life of Holy Prophet (S.A.W) in Madina
- 2) Important Events of Life Holy Prophet in Madina
- 3) Important Lessons Derived from the life of Holy Prophet in Madina

## **Introduction To Sunnah**

- 1) Basic Concepts of Hadith
- 2) History of Hadith
- 3) Kinds of Hadith
- 4) Uloom-ul-Hadith
- 5) Sunnah & Hadith
- 6) Legal Position of Sunnah

## **Selected Study from Text of Hadith**

### **Introduction To Islamic Law & Jurisprudence**

- 1) Basic Concepts of Islamic Law & Jurisprudence
- 2) History & Importance of Islamic Law & Jurisprudence
- 3) Sources of Islamic Law & Jurisprudence
- 4) Nature of Differences in Islamic Law
- 5) Islam and Sectarianism

### **Islamic Culture & Civilization**

- 1) Basic Concepts of Islamic Culture & Civilization
- 2) Historical Development of Islamic Culture & Civilization
- 3) Characteristics of Islamic Culture & Civilization
- 4) Islamic Culture & Civilization and Contemporary Issues

### **Islam & Science**

- 1) Basic Concepts of Islam & Science
- 2) Contributions of Muslims in the Development of Science
- 3) Quran & Science

### **Islamic Economic System**

- 1) Basic Concepts of Islamic Economic System
- 2) Means of Distribution of wealth in Islamic Economics
- 3) Islamic Concept of Riba
- 4) Islamic Ways of Trade & Commerce

### **Political System of Islam**

- 1) Basic Concepts of Islamic Political System
- 2) Islamic Concept of Sovereignty
- 3) Basic Institutions of Govt. in Islam

### **Islamic History**

- 1) Period of Khlaft-E-Rashida
- 2) Period of Ummayyads
- 3) Period of Abbasids

### **Social System of Islam**

- 1) Basic Concepts Of Social System Of Islam

- 2) Elements Of Family
- 3) Ethical Values Of Islam

**Reference Books:**

- 1) Hameed ullah Muhammad, "Emergence of Islam" , IRI, Islamabad
- 2) Hameed ullah Muhammad, "Muslim Conduct of State"
- 3) Hameed ullah Muhammad, 'Introduction to Islam
- 4) Mulana Muhammad Yousaf Islahi,"
- 5) Hussain Hamid Hassan, "An Introduction to the Study of Islamic Law" leaf Publication Islamabad, Pakistan.
- 6) Ahmad Hasan, "Principles of Islamic Jurisprudence" Islamic Research Institute, International Islamic University, Islamabad (1993)
- 7) Mir Waliullah, "Muslim Jurisprudence and the Quranic Law of Crimes" Islamic Book Service (1982)
- 8) H.S. Bhatia, "Studies in Islamic Law, Religion and Society" Deep & Deep Publications New Delhi (1989)
- 9) Dr. Muhammad Zia-ul-Haq, "Introduction to Al Sharia Al Islamia" Allama Iqbal Open University, Islamabad (2001)



## COMPULSORY MATHEMATICS COURSES FOR BS (4 YEAR)

(FOR STUDENTS NOT MAJORING IN  
MATHEMATICS)

### 1. MATHEMATICS I (ALGEBRA)

**Prerequisite(s):** Mathematics at secondary level

**Credit Hours:** 3 + 0

**Specific Objectives of the Course:** To prepare the students, not majoring in mathematics, with the essential tools of algebra to apply the concepts and the techniques in their respective disciplines.

#### **Course Outline:**

*Preliminaries:* Real-number system, complex numbers, introduction to sets, set operations, functions, types of functions.

*Matrices:* Introduction to matrices, types, matrix inverse, determinants, system of linear equations, Cramer’s rule.

*Quadratic Equations:* Solution of quadratic equations, qualitative analysis of roots of a quadratic equations, equations reducible to quadratic equations, cube roots of unity, relation between roots and coefficients of quadratic equations.

*Sequences and Series:* Arithmetic progression, geometric progression, harmonic progression.

*Binomial Theorem:* Introduction to mathematical induction, binomial theorem with rational and irrational indices.

*Trigonometry:* Fundamentals of trigonometry, trigonometric identities.

#### **Recommended Books:**

Dolciani MP, Wooton W, Beckenback EF, Sharron S, *Algebra 2 and Trigonometry*, 1978, Houghton & Mifflin,

Boston (suggested text)

Kaufmann JE, *College Algebra and Trigonometry*, 1987, PWS-Kent Company, Boston

Swokowski EW, *Fundamentals of Algebra and Trigonometry* (6<sup>th</sup> edition), 1986, PWS-Kent Company, Boston

**Statistics-I**

Definition and importance of Statistics in Agriculture, Data Different types of data and variables

Classification and Tabulation of data, Frequency distribution, stem-and-Leaf diagram, Graphical representation of data Histogram, frequency polygon, frequency curve.

Measure of Central tendency, Definition and calculation of Arithmetic mean, Geometric mean, Harmonic mean, Median quantiles and Mode in grouped and un-grouped data.

Measure of Dispersion, Definition and Calculation of Range, quartile deviation, Mean deviation, Standard deviation and variance, coefficient of variation.

**Practical:**

- a. Frequency Distribution
- b. Stem-and-Leaf diagram
- c. Various types of Graphs
- d. Mean, Geometric mean Harmonic Mean,
- e. Median, Quartiles Deviation, mean Deviation.
- f. Standard Deviation, Variance, Coefficient of variation,
- g. Skewness and kenosis

**Recommended Books:**

1. Introduction to Statistical Theory Part- I by Sher Muhammad and Dr. Shahid Kamal (Latest Edition)
2. Statistical Methods and Data Analysis by Dr. Faquir Muhammad
3. A. Concise Course in A. Level Statistic with world examples by J. Crashaw and J. Chambers (1994)
4. Basic Statistics an Inferential Approach 2<sup>nd</sup> Ed. (1986) Fran II. Dietrich-II and Thomas J. Keans

## Statistics-II

Credit 3 (2-1)

Sampling Probability and non-Probability Sampling, Simple random sampling stratified random sampling Systematic sampling error, Sampling distribution of mean and difference between two means. Interference Theory: Estimation and testing of hypothesis, Type—I and type-II error, Testing of hypothesis about mean and difference between two means using Z-test and t-test, Paired t-test, Test of association of attributes using  $X^2$  (chi-square) Testing hypothesis about variance.

### Practical:

- a. Sampling random sampling
- b. Stratified random sampling.
- c. Sampling distribution of mean
- d. Testing of hypotheses regarding population mean
- e. Testing of hypotheses about the difference between population means
- f. Chi-square test
- g. Testing of Correlation Coefficient
- h. Fitting of simple linear regression
- i. One-way ANOVA
- j. Two-way ANOVA

### Recommended Books:

1. Introduction to Statistical Theory Part-II by Sher Muhammad and Dr. Shahid Kamal (Latest Edition)
2. Statistical Methods and Data Analysis by Dr. Faquir Muhammad
3. Principles and Procedures of Statistics A Bio-material approach, 2<sup>nd</sup> Edition, 1980 by R. G. D Steal and James H. Tarric
4. Statistical Procedures for Agricultural Research 2<sup>nd</sup> Edition (1980) by K. A. Gomez and A. A. Gomez

**INTRODUCTION TO INFORMATION AND COMMUNICATION TECHNOLOGIES**

**Course Structure:** Lectures: 2 Labs: 1 **Credit Hours: 3**  
**Pre-requisite:** **None** **Semester: 1**

**Course Description:**

This is an introductory course on Information and Communication Technologies. Topics include ICT terminologies, hardware and software components, the internet and World Wide Web, and ICT based applications. After completing this course, a student will be able to:

- Understand different terms associated with ICT
- Identify various components of a computer system
- Identify the various categories of software and their usage
- Define the basic terms associated with communications and networking
- Understand different terms associated with the Internet and World Wide Web.
- Use various web tools including Web Browsers, E-mail clients and search utilities.
- Use text processing, spreadsheets and presentation tools
- Understand the enabling/pervasive features of ICT

**Course Contents:**

Basic Definitions & Concepts

Hardware: Computer Systems & Components

Storage Devices, Number Systems

Software: Operating Systems, Programming and Application Software

Introduction to Programming, Databases and Information Systems

Networks

Data Communication

The Internet, Browsers and Search Engines

The Internet: Email, Collaborative Computing and Social Networking

The Internet: E-Commerce

IT Security and other issues

Project Week

Review Week

**Text Books/Reference Books:**

1. Introduction to Computers by Peter Norton, 6th International Edition, McGraw-Hill
2. Using Information Technology: A Practical Introduction to Computer & Communications by Williams Sawyer, 6<sup>th</sup> Edition, McGraw-Hill
3. Computers, Communications & information: A user's introduction by Sarah E. Hutchinson, Stacey C. Swayer
4. Fundamentals of Information Technology by Alexis Leon, Mathews Leon, Leon Press.

